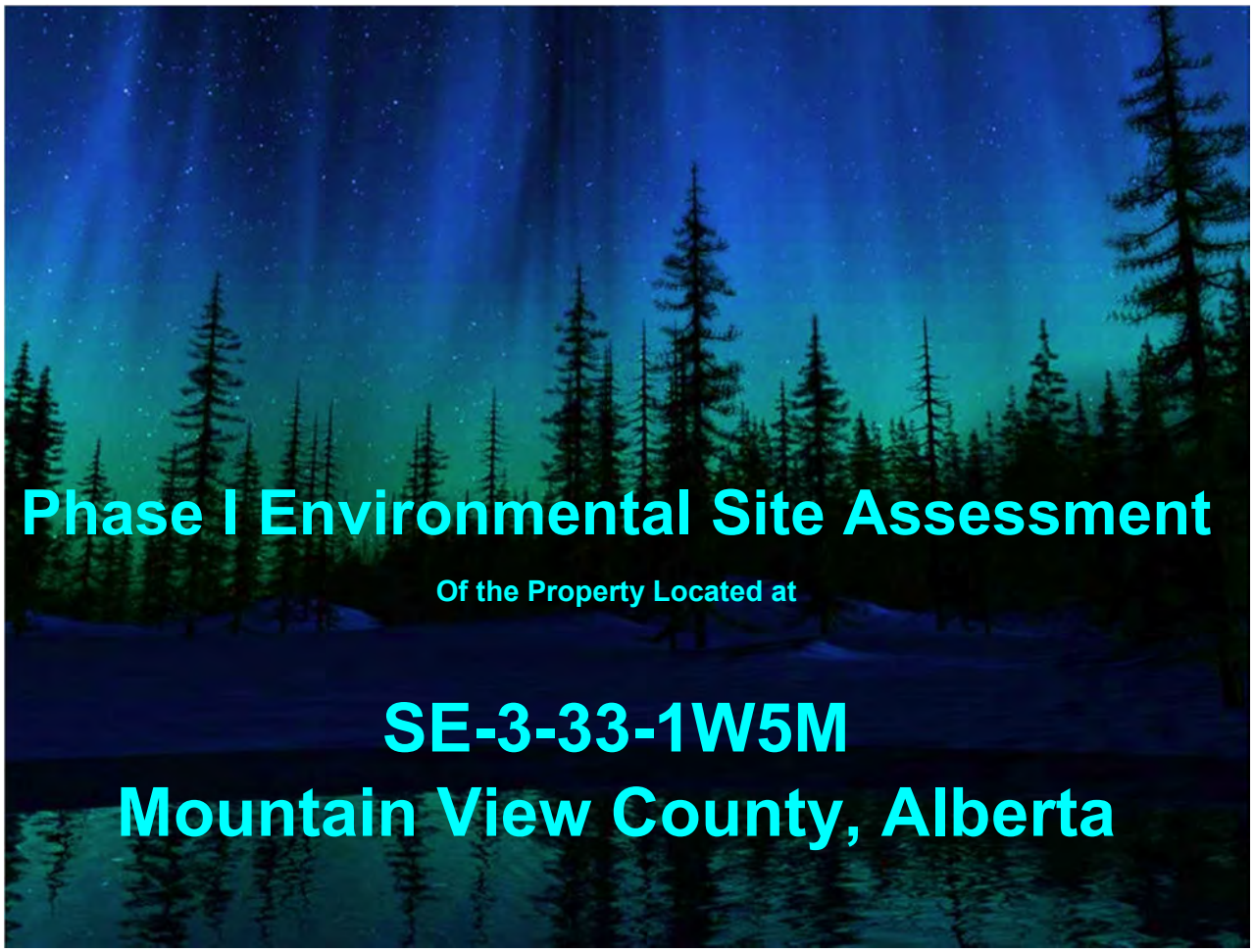
Bifröst
Environmental and Remediation Services Inc.



Phase I Environmental Site Assessment

Of the Property Located at

SE-3-33-1W5M
Mountain View County, Alberta

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1273927 Alberta Ltd.
PO Box 2452
Winkler, Manitoba R6W 4C2

Publication Date: Final – 4 September 2024

Project Numbers: 2023061 and 2024064 **Revision No.: 0**

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Bifröst
Environmental and Remediation Services Inc.

4 September 2024

Mr. John Froese
1273927 Alberta Ltd.
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via Email: gbrown@bastudios.ca

c/o

Mr. Greg Brown, Development Manager
B&A Studios
215 – 9th Avenue SW, Suite 600
Calgary, Alberta T2P 1K3

RE: CSA Phase I ESA
SE-3-33-1W5M
Olds, Alberta
Bifröst Project No.s: 2023061 and 2024064

Dear Mr. Brown:

Bifröst Environmental and Remediation Services Inc. is pleased to submit to you the completed report for the Canadian Standards Association (CSA) Phase I Environmental Site Assessment (ESA) on the above-referenced property (Project Site).

Per the notification requirements of the CSA standard, we are informing you that the Phase I ESA has revealed evidence of potential contamination associated with the Project Site, as well has revealed evidence of potential contamination associated with the properties surrounding the Project Site. Details related to the body of evidence for the above conclusions may be found within Sections 6, 7, 10, and 11 of the completed report.

We appreciate the opportunity to provide quality environmental and remediation consulting services. This report conveys our current knowledge and understanding of the Project Site, based upon the reasonably ascertainable, historical materials that were available.

We welcome any questions that you may have and are prepared to discuss any portion of the report that you may feel does not adequately reflect current information, or fulfill your needs. If you have any concerns regarding the above report, please feel free to contact me via email at mark.lehar@bifrostinc.ca or by phone at 587-777-5026.

Respectfully,
Bifröst Environmental and Remediation Services Inc.



Mark A. Lehar, P.Geo.
Assessor/Validator

Bifröst Environmental and Remediation Services Inc.
Association of Professional Engineers and Geoscientists of Alberta
Permit to Practice #P13568
Validated by: Mark A. Lehar
Date: 4 September 2024

Executive Summary

Mr. Greg Brown, on behalf of 1273927 Alberta Ltd., authorized Bifröst Environmental and Remediation Services Inc. (Bifröst) to complete a Canadian Standards Association (CSA) Phase 1 Environmental Site Assessment (ESA) of the property located at SE-3-33-1W5M near the town of Olds, Alberta (Project Site). The purpose of the CSA Phase 1 ESA is to: determine if areas of the property contain actual or potential contamination that may affect human health or the environment at the Project Site; determine if areas of the property contain actual or potential contamination that may affect human health or the environment on the surrounding properties; determine if the surrounding properties contain actual or potential contamination that may affect the Project Site; or, determine if actual or potential contamination at the Project Site may pose a monetary liability to the property owner or purchaser. The conclusions of the report are based upon the assumptions and guidelines established within the limits of the CSA standard.

Upon completion of the CSA Phase 1 ESA, which included: a current and a historical records review; a Project Site visit; interviews; and, an analysis of the retrieved information, it is the opinion of Bifröst that there is evidence of potential environmental contamination associated with the Project Site, as well as evidence of actual and potential environmental contamination associated with one of the surrounding properties. A description of the identified environmental liabilities, and their potential to affect the Project Site, are discussed below. Specific Project Site feature locations may be found in Figure 4, while the location of surrounding sites that may be of potential concern can be found in Figure 5. Information related to supplemental investigation discussion may be found on Figures 6-9.

- **No evidence of actual contamination was identified related to the Project Site.** Details related to these conclusions for the Project Site may be found in Sections 6.1 and 7.1.

- **Evidence of potential contamination was identified related to the Project Site.** The northwestern portion of the property (7-3-33-1W5M) contains a former oil and gas well that was drilled in 1978; however, the well was never put into production and Reclamation Certificate 4445 was issued. There is also evidence that there may also be an oil or gas well located on the northeastern portion of the property (8-3-33-1W5M). Geophysical and methane testing on this location indicates that a well was never drilled on this portion of the Project Site. Lastly, the area is identified as having a high, relative radon hazard potential.

  Radon may be present due to the presence of uranium and radium in the area soils, derived from glacial till. It is a function of the local geology and ubiquitous to all areas of southern Alberta, although the levels of exposure may vary.

  Details related to the above conclusions for the Project Site may be found in Sections 6.2, 7.2, and 11.2.

- **Evidence of actual historical contamination that could potentially affect the Project Site was not identified related to surrounding properties**. Details related to the conclusions for these sites may be found in Sections 6.3 and 7.3.

- **Evidence of potential contamination that could potentially affect the Project Site was identified related to surrounding properties.** Evidence of potential contamination was identified related to Location 2, the Olds Golf Course. The following conclusions may change based upon new information or more extensive investigation into additional surrounding properties. This included the discovery of above ground storage tanks (ASTs) located on the property immediately adjacent and to the north of the Project Site. These ASTs do not appear to have secondary containment, and the land at the Olds Golf Course where these ASTs are located, slopes towards the Project Site. If a catastrophic release were to occur, fuel could reach the Project Site. Details related to the conclusions for these sites may be found in Sections 6.4 and 7.4.

It is the recommendation of Bifröst that additional investigation be completed on both the known Marathon well located on LSD 7, as well as the suspected well lease located on LSD 8. This is important to note that the construction of residential and other properties within this area, may potentially be affected by venting gasses from the former well, or the suspected well location.

This recommendation has been completed and while some lower levels of methane were detected, no direct evidence of venting gasses associated with a former oil or gas well was identified on either location.

Additionally, based upon the unknown final disposition of drilling wastes associated with the former Marathon well drilled in LSD 7, care should be taken during excavation of topsoil and subsoils, in case drilling or other wastes may have been buried upon the Project Site.

It is recommended that during the Project Site development phase, the contractors responsible for clearing and either removing the local topsoil, or cutting the subsoils to grade, be made aware of the potential for drilling wastes and/or organic soils that may produce methane gas. As indicated in the geotechnical reports, organic materials should be removed from the areas of future building construction.

Lastly, properly designed grading and constructed ditches on the northern portion of the Project Site could prevent contamination from entering the property, if a catastrophic failure were to occur, associated with one of the ASTs located on the Olds Golf Club property.

There do not appear to be any conditions that would preclude development of the Project Site.

The Executive Summary should not be read in isolation, but as a portion of the overall report. The statements and conclusions made in the Executive Summary are subject to the same limitations as those included in Section 15.0, Closure.

List of Acronyms

ACMs	Asbestos-Containing Materials
AENV	Alberta Environment
AEP	Alberta Environmental and Parks
AER	Alberta Energy Regulator
AESRD	Alberta Environment and Sustainable Resource Development
AHS	Alberta Health Services
Alberta EPA	Alberta Environment and Protected Areas
ASCC	Alberta Safety Codes Council
asl	above sea level
ASTs	Aboveground Storage Tanks
ATS	Alberta Township System
AWSA	Agrichemical Warehousing Standards Association
bgs	below ground surface
Bifröst	Bifröst Environmental and Remediation Services Inc.
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
CEPA	Canadian Environmental Protection Act, 1999
COC	Chain of Custody
CoCs	Chemicals of Concern
COPCs	Chemicals of Potential Concern
CSA	Canadian Standards Association
CWA	Canada Water Act, 1970
DEP	Department of the Environment
DUA	Domestic Use Aquifer
ELC	Environmental Law Center
EPA	Environmental Protection Agency, United States
EPEA	Environmental Protection and Enhancement Act, Alberta
ERCB	Energy Resources Conservation Board
ERIS	Environmental Risk Information Services
ESA	Environmental Site Assessment
ESAR	Environmental Site Assessment Repository
F1 – F2	Petroleum Hydrocarbon Fractions F1 – F2, Groundwater
F1 – F4	Petroleum Hydrocarbon Fractions F1 – F4, Soil
FAL	Freshwater Aquatic Life
FIPs	Fire Insurance Plans
FOIP	Freedom of Information and Protection of Privacy
FPR	Free Product Recovery
GIS	Groundwater Information System
ha	hectare
HEES	Historical Environmental Enforcement Search
HELP	Help End Landfill Pollution Database

LEL	Lower Explosive Limit
mg/L	milligrams per liter
MSDS	Material Safety Data Sheet
msl	mean sea level
MTBE	Methyl Tertiary Butyl Ether
MUST	Management of Underground Storage Tanks
NPRI	National Pollutant Release Inventory
ODS	Ozone Depleting Substances
OWS	Oil/Water Separator
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCP	Pentachlorophenol
PCS	Petroleum Contaminated Soils
PHCs	Petroleum Hydrocarbons
ppb	parts per billion
ppm	parts per million
PSTs	Petroleum Storage Tanks
PTAP	PTMAA Petroleum Tanks Approved Permit Database
PTMAA	Petroleum Tank Management Association of Alberta
RMP	Risk Management Plan
ROW	Right of Way
RPD	Relative Percent Difference
SVE	Soil Vapour Extraction
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
THC	Total Hydrocarbons
TPH	Total Petroleum Hydrocarbons
UFFI	Urea Formaldehyde Foam Insulation
USTs	Underground Storage Tanks
UV	Ultra Violet
VOCs	Volatile Organic Compounds
WHMIS	Workplace Hazardous Materials Information System
WWIS	Water Well Information System, Alberta

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1.0 INTRODUCTION

Mr. Greg Brown, on behalf of 1273927 Alberta Ltd., authorized Bifröst to complete a CSA Phase 1 ESA on the property located at SE-3-33-1W5M near the town of Olds, Alberta (Project Site). The authorization included permission for the acquisition of records, as well as permission to interview the current owners, and to fully access the entire Project Site.

1.1 Purpose and Use

The purpose of the CSA Phase 1 ESA was to: determine whether areas of the property contain, or are likely to contain, actual or potential contamination that may affect human health or the environment at the Project Site; determine if areas of the property contain, or are likely to contain, actual or potential contamination that may affect human health or the environment on the surrounding properties; determine if the surrounding properties are likely to contain actual or potential contamination that may affect the Project Site; or, determine if actual or potential contamination at the Project Site may pose a monetary liability to the property owner or purchaser, within the limits of the CSA standard.

It is understood by Bifröst that the CSA Phase I ESA is being completed for the internal purpose of permanent records retention and documentation, as well as due diligence for the purpose of future development within Mountain View County.

1.2 Scope of Work and Methodology

The completion of a CSA Phase I ESA allows the current User and 1273927 Alberta Ltd., to obtain an understanding of the environmental impact and the associated potential environmental liabilities related to the Project Site, by reviewing documented information regarding the Project Site history, as well as past practices of businesses that may have occupied the Project Site or surrounding properties. Analysis of this information may lead to the conclusion that past activities have led to actual contamination of the Project Site's soil, groundwater, soil gasses, or other media. This analysis may also conclude that the past activities have led to potential contamination of the Project Site in the past, or may yet potentially contaminate the Project Site at a time in the future. The CSA standard to be used during this assessment will be the *Phase I Environmental Site Assessment* document Z768-01 (current version).

This CSA Phase I ESA included a records review, a Project Site visit, interviews, an evaluation of acquired information, and the completion of a report.

1.2.1 Records Review

The records review consisted of an attempt to acquire all CSA mandatory information, including:

- Aerial photographs
- Property-use records (e.g. fire insurance plans, city directories, site registries)
- A land title search and review of assessment rolls
- Review of prior Phase I ESA reports
- Company records
- Geological and geotechnical reports, and
- Regulatory information

The purpose of the records review is to develop data on past activities via the above sources, in an attempt to identify past practices that could lead to contamination of the Project Site. A satisfactory records review will lead to: a thorough understanding of the Project Site's history; an understanding of the potential for contamination to be associated with the Project Site; and, documentation with respect to the identification of actual or potential contamination.

Historical information was reviewed as far back as the first developed use of the Project Site, or to the extent that the information was both reasonably ascertainable and practically reviewable, within the limits of time and budget. A search radius of 300m was used during the acquisition of historical data for the Project Site, unless otherwise indicated.

The records review additionally consisted of the review of optional records, as defined by the CSA Standard, which were necessary to provide an accurate and thorough picture of the history of the site. These records included some or all of the following:

- Geological and soil maps
- Topographic maps
- Agreements of the purchase and sale of the property
- Land use documents
- Public health concerns
- Utility company records
- Local information sources, and
- Other helpful information

1.2.2 Project Site Visit

The Project Site visit consisted of both an exterior and interior (if applicable) inspection of the property, and an exterior inspection of the surrounding properties. The surrounding properties were only inspected from the Project Site, publicly accessible areas, or right of ways.

1.2.2.1 Exterior Inspection

While present on the Project Site, the Assessor inspected the exterior of the Project Site and surrounding properties for evidence of various items, including some (as applicable) or all of the following:

- Property use
- Observation of neighboring properties
- Topographic, geologic, and hydrogeological conditions
- General construction and description of the existing structures
- Hazardous materials
- Unidentified substances
- Storage tanks
- Storage containers
- Stains
- Odours
- Wells
- Sewage disposal
- Pits, ponds and lagoons
- Stressed vegetation
- Fill
- Waste water
- Watercourses, ditches, or standing water
- Roads, parking facilities, and right of ways
- The potable water supply, and
- Special attention items, including:

  - ACMs
  - Lead
  - ODS,
  - PCBs,
  - Radon, and
  - UFFI

1.2.2.2 Interior Inspection

Additionally, the Assessor inspected the interior of the Project Site (if applicable) for evidence of various items, including:

- Heating and cooling systems
- Hazardous materials
- Unidentified substances
- Storage tanks
- Storage containers
- Stains
- Drains and sumps
- Mechanical equipment, and
- Special attention items, including:

  - ACMs
  - Lead

- Mould
- ODS,
- PCBs
- Radon, and
- UFFI

1.2.3 Interviews

Interviews were conducted to corroborate or augment the information collected during the records review and the Project Site inspection. The Assessor attempted to interview a representative while on the Project Site, as well as owners, other occupants, or employees. If necessary, the Assessor may choose to interview neighbours or former Project Site employees. If available and necessary, the Assessor shall attempt to interview government employees to corroborate the information acquired during the records review.

1.2.4 Evaluation of Information

The Assessor evaluated the findings of the previously completed records review, Project Site visit, and interviews. The information was identified and organized to distinguish fact from opinion, compiled, and then summarized for the Client in such a way that they may be able to understand the significance of the findings. All identified areas of actual or potential contamination were noted, described, and discussed. Surrounding properties and other properties of interest that appeared in the records review were also noted, described, and discussed. The discussions centered around the rationale of whether to keep the property in the discussion, or to remove the property from further consideration, and why it was no longer of environmental interest with respect to the Project Site.

1.2.5 Reporting

A report was generated to contain the information described above. The report included an Executive Summary, as well as sections on the purpose, scope, methodology, the evaluation of information, and conclusions. A Photographic Log that both shows and describes significant areas of the Project Site or particular areas of interest, as well as the surrounding properties, was attached as an appendix. Any deviation from the CSA standard was noted, as well as the reasons for the deviation. Limitations, based upon Project Site conditions, were identified. The report was signed by the Assessor and a statement of qualifications for the Assessor has been included. Documentation to support the findings was included in the report appendices. Any applicable legislation and guidelines are referenced.

1.3 Deviations from the Canadian Site Assessment Standard

Any deviations from the CSA standard were noted in the report section where they occurred and were summarized prior to the report conclusions in the discussion section.

1.4 Limitations

Any limiting conditions that were identified during the completion of the CSA Phase I ESA were noted in the report in reference to the areas of the Project Site where they occurred, and referenced to the section of the report to which they applied. Any limitations were summarized prior to the report conclusions.

2.0 SITE DESCRIPTION AND INITIAL INFORMATION

Bifröst understands that the Project Site consists of a quarter section (SE-3-33-1W5M) located near the town of Olds, Alberta. An initial view of the property using a Google search of the location shows that Site appears to be current or former farmed lands. A *Site Location Map* is provided as Figure 1, while an aerial photograph showing the general layout of the *Site and Surrounding Properties*, as well as their land use, may be found as Figure 2.

At this point in the evaluation prior to the historical records review, the acreage encompassed by the Project Site, building footprints, other current site information, as well as any additional historical background details, are unknown. At the start of this project, the initial information provided by the Client and a view of the Project Site using a Google aerial view was limited; however, in the interests of costs, additional information that would be found in the later records review has been included on Figure 2. Subsequent details provided later by the Client via correspondence or interviews are included in the appropriate sections.

The description of the Project Site in more detail is included in Sections 4.0 and 6.0, after the acquisition of both historical information and observations of the Project Site during the assessment process.

3.0 RECORDS REVIEW

The information acquired during the records review is provided below.

3.1 Mandatory Records

Mandatory records are those records that must be reviewed by the Assessor, according to the CSA standard, as long as those records exist. A discussion of the record should be included, even if a null result is identified. Locations of various sites may be referenced from Figure 2. Figure 3 is a generalized Site Diagram, while Figure 4 emphasises details of the Site.

3.1.1 Aerial photographs

Aerial photographs, when viewed sequentially, provide a visual history of changes that have occurred on the Project Site, as well as over the surrounding area, for the period during which such images are available. Generally, it is sufficient to acquire aerial photographs at a rate of one per decade. In a Phase 1 ESA, generally (but not always) the time available to complete the report and the available budget does not allow the Accessor the opportunity to review additional aerial photographs in the intervening years. If such a review becomes necessary, it can generally be completed as an addendum or within a following phase of the assessment process.

The reviews of the aerial photographs are generally structured to describe the Project Site first, followed by the surrounding properties clockwise from north to west or northwest. Depending on the quality and scale of the photograph, various features may be observable. These include structures and improvements, ASTs, tank farms, pits, poorly drained areas, property access routes, disturbed soil, adjacent properties, water features, historical changes to the course of rivers, agricultural use and former forested areas. Copies of the aerial photographs reviewed during this assessment and focused on the Project Site may be found in Appendix A. In some cases, images of the aerial photographs that cover a larger area, including the surrounding properties in detail, are retained in the project files.

3.1.1.1 1949 Aerial Photograph

The first aerial photograph available for the Project Site, an image from 1949 (Appendix A1), is somewhat blurry and lacks fine detail. The Project Site appears to be in use as agricultural fields and what may be holding pens, livestock areas that are fenced, or areas of much darker albedo within a lighter field. These two areas are located within the northcentral and west central portions of the Site. Both fields appear to have straight line edges that imply fencing. Of the two areas that are dark and rectangular, one has been constructed with the long side running east and west (western area), and a second on the eastern end, with the long sides running roughly north and south. The north central portion of the Project Site appears to have a natural drainage area within it, with inlets or outlets on both the north and south ends.

The eastern portion of the Project Site is still being worked, as evidenced by the "V" pattern, or chevron, within the field on the northern portion of the field. Just south of this chevron in the field, is a bare area that appears to be the potential remnants of some activity or area of less fertile soil, even possibly a former well lease area, as seen more clearly, in later aerial photographs.

The southwestern corner of the Project Site, there appear to be a number of trails converging on the southwestern corner. This may be the access point for agricultural use of the property.

To the north, east, south, and west of the Project Site, the land use is the same as the Project Site. The Site is bounded by roads to the east and south. Structures are present on the lands to the northeast and southeast a short distance away. Buildings to the west-southwest are located at the far edge of the adjacent quarter section, while buildings to the northwest are also located at the edge of the adjacent northwestern quarter section.

3.1.1.2 1963 Aerial Photograph

The aerial photograph from 1963 (Appendix A2) shows the Project Site to be very similar to what is shown in the 1949 aerial photograph; however, the two large, dark rectangular areas are no longer present. The Project Site is observable in the aerial photograph and appears to not have changed much since the previous aerial photograph, as it appears to remain agricultural. The northern portion of the Site appears to be very wet and shows two marshy or wet areas. There also appears to be a portion of a wet area in the northwestern corner that is also present on the adjacent three parcels to the north and west. These wet areas appear to be outlined by the cut of the fields. As mentioned in the previous aerial photograph, there is a bare area in the northeastern section of the quarter (LSD 8) that is more defined and has a much darker track running north from, or into it.

A stream appears to cut across this area from the north central portion of the Site, meandering to the southeast. The outline of the fields also appear to follow this stream. The dark area on the eastern portion of the site appears the same as in the previous aerial photograph and there is potential visual evidence of an object located on the west central portion of this darker area of field. The fields are roughly broken into thirds, running north and south. The southern side of the Site appears to have two entrance locations where there are visibly raised areas crossing over a drainage ditch. A small wet area also appears near the southwestern corner. In the far eastern third of the Project Site, an area of disturbance appears to exist in the northeastern portion.

To lands surrounding the Project Site appear to also be utilized as agricultural and are roughly the same as in the 1949 aerial photograph, with the exception of several structures on the property located off of the southeastern corner of the Site and rolls of hay bales that are seen to the northwest.

3.1.1.3 1969 Aerial Photograph

The aerial photograph from 1969 (Appendix A3) is clear and has good detail. The Project Site is observable in the aerial photograph and appears to not have changed much since the previous aerial photograph, as it remains either agricultural or in natural use. At least one stream appears to be visible as previously described and wet areas in the north central portion of the Project Site are avoided and not farmed. However, the far northern portion of the Project Site must have been dry enough that it was planted. The bare area in the northeastern quarter has been farmed over and now appears as a darker patch through the crop rows.

To the north, east, south, and west of the Project Site, the land use and features are roughly the same as discussed in the previous aerial photographs.

3.1.1.4 1975 Aerial Photograph

The aerial photograph from 1975 (Appendix A4) is relatively clear and has decent detail. The Project Site is observable in the aerial photograph and appears to not have any significant changes from the previously viewed aerial photograph with the exception of the middle third, which now has a number of smaller the water features, and the far western third, which has a large water feature between it and the middle third. Additionally, there appears to be a large unknown white object in the west-central portion of the eastern third.

It appears that this may have been a very wet time prior to this aerial photograph being captured, as there is ample evidence of the area being saturated enough that small residual wet areas or ponds remain. The stream located on the eastern side of the middle third appears to have been artificially straightened, both in the north and south, from its previous course. A small wet area is also visible in the southwestern corner of the Site. The bare patch is again visible in the northeastern quarter.

The surrounding properties also do not appear to have any significant changes from the previous aerial photograph, although there is evidence that the land to the west was also experiencing large amounts of standing water.

3.1.1.5 1980 Aerial Photograph

The aerial photograph from 1980 (Appendix A5) is relatively clear and has decent detail. The Project Site is observable in the aerial photograph and appears to not have many significant changes from the previously viewed aerial photograph, with the exception of a number of water features having been reduced in size. Some trees are visible in the northwestern corner of the Site near a wet area. There does appear to be the remnants of a lease area in the northern middle third of the Project Site, as well as an access road into the central portion of the lease area, entering from the north. The bare patch is again more distinctly visible in the northeastern quarter, in what had previously been the eastern third.

The surrounding properties also do not appear to have any significant changes from the previous aerial photograph, with the exception of the property to the north. The western half of this quarter section appears to have been converted from agricultural use into a golf course.

3.1.1.6 1985 Aerial Photograph

The aerial photograph from 1985 (Appendix A6) is relatively clear and has good detail. It appears that the Project Site remains agricultural and appears to not have any significant changes from the previously viewed aerial photograph, although there are fewer wet areas present. There is one new straight line feature that runs between the north-central portion of the Project Site across from an entrance to the golf course, and the middle of the western half of the southern portion of the Project Site.

The bare area in the northeastern quarter (LSD 8) is now once again covered by crops; but, a rectangular area surrounds the bare area and appears to have lighter areas of ingress into the area from both the north and east. The area appears to be the same size and in roughly the same position within the quarter as a later identified lease area on the adjacent western LSD 7. There is a possibility that his area may be a former lease that may have not been recorded.

There do not appear to be any significant changes to the surrounding properties.

3.1.1.7 1991 Aerial Photograph

The aerial photograph from 1991 (Appendix A7) is relatively clear and has good detail; however, the far western portion of the Site has been cut off, as have been the western properties. The western areas were not recorded during this flight interval. The Project Site is observable in the aerial photograph and appears to have not changed since the previous aerial photograph, with the exception that all three previously visible distinctive areas that had divided the property into thirds have been joined into one large field. A larger water feature is visible in the north-central portion of the Site. The bare area in the northeastern quarter is not visibly bare anymore; however, what may be the outlines of a suspected lease area is still slightly visible.

With respect to the surrounding property to the north, the entire quarter section now appears to be a golf course. The surrounding properties to the northeast, east, and south do not appear to have changed significantly since the previous aerial photograph. As previously mentioned, the property to the west is not visible.

3.1.1.8 1998 Aerial Photograph

The aerial photograph from 1998 (Appendix A8) is relatively clear and has good detail. It appears that the Project Site remains agricultural and appears to not have any significant changes from the previously viewed aerial photograph, with the exception that the property appears to be drier. What appear to be visible water course or trails crisscross the property. The suspected lease area on LSD 7 is distinctly visible in this

aerial photograph with an access road coming into the area from the north. The outlines are very distinct. Additionally, the suspected lease area on LSD 8 is also distinctly visible in this aerial photograph with an access road coming into the area from the north. The outlines are very distinct.

There do not appear to be any significant changes to the surrounding properties other than the additional of additional structures and enlargement of the parking area associated with the golf course on the northern adjacent property, and an expansion of the structures on the southeastern property.

3.1.1.9 2005 Aerial Photograph

The aerial photograph from 2005 (Appendix A9) is relatively clear and has good detail. It appears that the Project Site remains agricultural and appears to not have any significant changes from the previously viewed aerial photograph, with the exception that the property is drier still and what may be hay bales, or other oval objects in each of the four quadrants of the property. Vehicle tracks do lead to these objects. These features cast long oval shadows. Evidence is not visible of either the known lease on LSD 7, or the suspect lease on LSD 8, in this aerial photograph.

There do not appear to be any significant changes to the surrounding properties other than the additional of additional structures associated with the golf course on the northern adjacent property.

3.1.1.10 2009 Aerial Photograph

The aerial photograph from 2009 (Appendix A10) is relatively clear and has good detail. It appears that the Project Site remains agricultural and appears to not have any significant changes from the previously viewed aerial photograph. However the access road on the northeastern quarter of the suspected lease area is visible, as are the faint outlines of the suspected lease.

There do not appear to be any significant changes to the surrounding properties.

3.1.1.11 2011 Aerial Photograph

The aerial photograph from 2011 (Appendix A11) is relatively clear and has good detail. It appears that the Project Site remains agricultural and appears to not have any significant changes from the previously viewed aerial photograph. However the access road on the northeastern quarter of the suspected lease area is visible, as are the faint outlines of the suspected lease. A row of plastic covered hay bales appears to be located along the northeastern portion of the Site.

There do not appear to be any significant changes to the surrounding properties.

3.1.1.12 2015 Google Earth Image

The aerial photograph from 2015 (Appendix A12) is relatively clear and has good colour detail. The Project Site is observable in the aerial photograph and does not appear to have changed significantly since the 2011 aerial photograph, with the exception of some areas of the northern portion of the property that appear to be wetter than normal. Evidence is not visible of either the known lease on LSD 7, or the suspect lease on LSD 8, in this aerial photograph.

The surrounding sites have not changed significantly.

3.1.1.13 2018 Google Earth Image

The aerial photograph from 2018 (Appendix A13) is relatively clear and has good colour detail. The Project Site is observable in the aerial photograph and does not appear to have changed significantly since the 2015 aerial photograph, with the exception of some areas of the northern portion of the property that appear to be wetter than normal under the false colouring that shows the vegetation types. Evidence is not visible of either the known lease on LSD 7, or the suspect lease on LSD 8, in this aerial photograph.

The surrounding sites have not changed significantly.

3.1.1.14 2021 Google Earth Image

The aerial photograph image from 2021 (Appendix A14) is relatively clear and has good colour detail. The Project Site is observable in the aerial photograph and does not appear to have changed significantly since the 2018 aerial photograph; however a lack of moisture in the area really brings out those areas with access to water, as they are much darker in colour in this image. Evidence is not visible of either the known lease on LSD 7, or the suspect lease on LSD 8, in this aerial photograph.

This aerial photograph is used for the details shown on Figure 4. On the highest magnification and starting in the northwest corner, we can see the pump house and "wavy" lake on the northern adjacent property, as well as the heavily vegetated drainage ditch on the northern boundary of Block A. Several areas of white appear on the southern side of the road into the golf course property, corresponding to a former concrete retaining wall identified during the Project Site visit (see Section 4.1.2.1). The shadows of power poles are visible on the northern adjacent property, as are the pole-mounted transformers on them.

On the Project Site approximately 210m inset from the western property boundary, is an area of standing water and increased vegetation. This zone crosses a small section of the northern property Block A from the area of the drainage ditch, and then spreads out into the remainder of the Project Site in this area. At a distance of approximately 440m, another area of standing water and increased vegetation is identified, although this one extends well south into the Project Site. This water entry from the drainage ditch into the Project Site increases in size as it enters the Site property; at times increasing to

almost 90m in width in the southern portions of the uncultivated area, and reaches a distance of approximately 320m south of the northern property line in this aerial photograph. When viewing the false colour image of Appendix A13, the extent of the former waterway can be seen to pass through the entire Site to the southern Project Site boundary. This area has a much lighter colouration in Appendix A13 than the surrounding fields, indicating that much more vegetation, hence water, is present in this area.

On Appendix A13 at a distance of 640m from the western property boundary is another area of lighter green, extending south into the Project Site.

The northern entrance to the property off of Range Road 12 appears to be constructed across the drainage ditch prior to entering the fields. Two large rectangular white objects are visible at the end of this area and may be vehicle barriers. Near the southern entrance to the Project Site, off of Range Road 12, is another constructed entrance. This one is not barricaded and shows heavy vehicular traffic usage from the visible ruts and tire tracks in the fields focusing on this one location and radiating out in all directions.

Once in the fields and just north of the southern entrance off of Range Road 12, there appears to be some type of earth stabilization grating, as there are multiple perpendicular lines with bare earth showing through, within this area. The area is approximately 590m from the northern property line and is approximately 100m in length and 20m in width.

The surrounding sites have not changed significantly. However, environmentally significant features besides those items discussed above are labelled on Figure 4. The battery charging building and a fuel AST for the Olds Golf Club are located on the central portion of the southern side of the course, while a maintenance structure and additional fuel ASTs are present near the eastern portion of the southern side of the course.

3.1.1.15 2023 Google Earth Image

The aerial photograph image from 2023 (Appendix A15) is relatively clear and has good colour detail. The Project Site is observable in the aerial photograph and does not appear to have changed significantly since the 2021 aerial photograph. Evidence is not visible of either the known lease on LSD 7, or the suspect lease on LSD 8, in this aerial photograph.

The surrounding sites have not changed significantly.

3.1.2 Property-use records

Property-use records are those records that are mainly historical in nature and that give a view of the activities, structures, ownership, and other site-specific information regarding the piece of property under investigation.

3.1.2.1 Fire Insurance Plans

FIPs are historical maps used by the insurance and fire protection industries to identify structures containing or storing flammable or combustible materials, and are verified via on-site inspection and documentation. Structures that were a better investment risk, due to the use of flame-retardant materials in a building's construction, would be insured at better rates by the industry. Conversely, highly flammable structures would be charged a higher premium. The maps were also used to identify areas of potential concern related to the housing of dangerous chemicals or petroleum products, should a fire break out in a structure. The plans often show the location and contents of various tanks, both ASTs and USTs, as well as utilities, gas lines, water lines, ACM, and other items of interest. Copies of the FIP results may be found in Appendix B.

FIPs were not ordered through ERIS for this Phase I ESA. The Project Site area was located outside of the municipal areas covered by FIPs in Alberta, during the time that these types of records were generated; therefore, no FIPs were to be found related to the Project Site or the surrounding properties.

3.1.2.2 City Directories

City directories are historical records created by the local telephone company that identify who was located at a particular property address for the year of publication. The directories are generally found in more urban locations. The directories included the "white" pages (residential listings), "yellow" pages (commercial listings), and sometimes a crisscross directory that organized listings by phone number or street address, instead of the standard listing by last name or business name. Copies of the City Directory results, if applicable, may be found in Appendix C.

There were no historical city directories available for this area east of the town of Olds. The town of Olds currently has no map-based business directory, or searchable list of commercial or industrial businesses for this area of planned development.

3.1.2.3 Alberta Environment and Protected Areas - Environmental Site Assessment Repository

The Alberta EPA ESAR database is a compilation of environmental site assessment, remediation, and reclamation documents that have been submitted to Alberta EPA for sites within Alberta. While the submittal of Phase I ESAs to Alberta EPA is not required, they are often found within the ESAR database. Phase II ESAs, remediation activities, and any sampling activities are required to be submitted to Alberta EPA for inclusion within the ESAR database. Copies of selected ESAR documents within a minimum

300m search radius, as well as other important sites outside of that radius and applicable to this Phase I ESA, can be found in Appendix D.

Two documents were retrieved from the ESAR database related to reclamation activities or environmental assessment work that had occurred in the area surrounding the Project Site. Based upon the information contained on the ESAR mapping page, the two related documents were downloaded for the property itself. A view of the ESAR database mapping function indicates that the next closest property that contained documents in the database is almost two kilometers to the southeast. A description of the retrieved documents are found in the section below.

3.1.2.3.1 Marathon Petroleum Canada Ltd.; 7-3-33-1 W5M

Two documents were retrieved from the ESAR database (2305545) for a former Marathon Petroleum Canada Ltd. (MPCL) well site lease located within the northeast quarter of the Project Site (Location 1B). The MPCL information was a part of the reclamation documents found within the ESAR database.

The first document retrieved from the ESAR database was correspondence from MPCL to the land owner regarding a notice of surrender of the lease, effective 31 July 1979. The document further indicates that the original surface lease was effective on 31 July 1978. In other documents attached to the file, a request to the Surface Reclamation Council for a Reclamation Certificate was found and dated 24 July 1979. The Surface Reclamation Council responded on 26 July 1979, and indicated that an inquiry would be held with respect to the condition of the land for Reclamation Certificate 4445. A copy of this document may be found in Appendix D1.

The second document retrieved from the ESAR database appears to be a continuation of the previous document and identified as Pages 13 and 15. In this document, dated 2 August 1979, it is referenced that Reclamation Certificate No. 4445 was issued on 26 July 1979. Additionally, a further document dated 31 August 1979 was attached indicating that an inquiry was held and that there was not any need for a reclamation order. A copy of this document may be found in Appendix D1.

3.1.3 Land Titles

Land title documents are government records of the purchase and sale of land, as well as the easements, mortgages, and other financial and legal documents applied to a piece of property. Land title documents can identify ownership of the property, as well as factors that may affect the environmental history of the property. Surveys are often also included within the land title record archives. Copies of the titles, as well as a survey associated with the Project Site, may be found in Appendix E.

A review of the Project Site within the Alberta Spin 2 system reveals that the Project Site consists of two parcels: SE-3-33-1W5M, outside of and east of the town of Olds, containing approximately 64.7 hectares (160 acres), excepting several road allowances;

and, a subdivision plan (Block A - 3.4 hectares 8.40 acres). The quarter section is situated north and adjacent of Highway 27 and west and adjacent of Range Road 12.

A summary of the most recent ownership of the parcels is included below, with the most recent title first. It should be noted that tables below do not represent a complete chain of title, nor a continuous chain of title between all of the titles gathered. Representative titles, orders, easements, ROWs, and restrictive covenants were collected, as a complete historical chain of title was beyond the time frame and budget for this project.

3.1.3.1 Table 1 – SE-3-33-1W5M

Years of Ownership / Action	**Owner of Record**
Current – February 2008	Abe Neufield, 1273927 Alberta Ltd., 404048 Alberta Ltd.
January 1992 – Subdivision Plan	Richardson Bros (Olds) Limited
February 2008 – December 1988	Richardson Bros (Olds) Limited

Several important easements were identified within the titles that were recovered, including (may now be located on surrounding parcels, after splits):

3.1.3.2 Table 2 – Easements and Caveats

Year / Type	**Grantee**
April 2010	Amended ROW Agreement - Olds Golf Club Association
January 2006	ROW (water pipeline) – Olds Golf Club Association
January 2005	Utility ROW – Name change to Fortis Alberta Inc.
August 1989	Utility ROW – TransAlta

Copies of the referenced titles associated with SE-3-33-1W5M, may be found in Appendix E1.

3.1.3.3 Survey Plans

Six survey plans were acquired showing the Site at varying times over the last 80 or so years. The *Survey of Telephone Right of Way* was completed in March of 1942 and shows an area north and adjacent to what is now Highway 27.

The second survey plan is the *Highway Connecting Olds to No. 2 Hwy*, completed in April of 1957 and shows the area to be acquired for the connection and widening of Highway 27.

The third survey is a *Plan Showing Survey of Public Work (Road)*, completed in May of 1981 and shows the area on the east side of the Site required for the widening of Range Road 12.

The fourth survey is a *Plan Showing Survey of Road Widening*, completed in March of 1987 and shows the area on the east side of the Site required for the widening of the intersection of Range Road 12 and Highway 27.

The fifth survey is a *Monument Survey*, completed in December of 1988 and shows the location of various survey monuments on or near the Site.

The sixth and final survey is a *Plan Showing Subdivision of a Part of SE-3-33-1W5M*, detailing the parcel on the northern side of the Site.

A copy of the surveys associated with SE-3-33-1W5M, may be found in Appendix E2.

3.1.4 Assessment Rolls

Assessment rolls can often list additional details about the Project Site that are not found within a land title. Details such as the number of structures, type of business, storage tanks, and other features may be listed on the assessment rolls, depending on the municipality of origin.

Specific assessment rolls were not reasonably ascertainable during this investigation without the expenditure of funds over and above the original budget. Other acquired information indicated that the Project Site has never had structures upon it; therefore, the Assessor did not review the assessment rolls.

3.1.5 Prior Phase I Environmental Site Assessment Reports

Prior Phase I ESAs completed on a property can provide valuable historical information about a Project Site. Resources unavailable to the current Assessor, resources that are no longer available, personal information, Phase I ESAs completed on a business that is no longer present, and Phase I ESAs completed with a differing end objective can all lead to a better understanding of the condition of the Project Site.

Prior Phase I ESAs of the Project Site or surrounding properties, other than those found within the *ESAR Database* (see Section 3.1.2.3) or provided by the Client (see Section 3.1.6.15), were not discovered during the review.

3.1.6 Company records

Company records are those private, internal documents and files that provide a history of decisions related to the property and that would not be necessarily available from any other source other than the Company itself, or their designees. These documents may or may not have been submitted to an agency, or been placed in the public domain; but, are more likely to have been a part of the internal workings and decision-making process within the company. Copies of any acquired company records may be found in Appendix F.

3.1.6.1 Site Plans

Site plans are extremely useful in that they can provide details on the parcel, configuration of structures, historical structure locations, lot sizes, and other items that may be of use during the assessment.

Neither the Client nor the Project Site owners provided a copy of a site plan. If site plans were available from other sources, they are listed in the section of the historical records where they were discovered.

3.1.6.2 Building Plans

Building plans are extremely useful in that they can provide details of construction, materials, configuration of internal spaces, process areas, storage areas, and other items that may be of importance during the assessment.

Neither the Client nor the Project Site owners provided a copy of any building plans. It does not appear that any buildings have been constructed on the property by the current property owners and no evidence was found of structures on the Site property built by former owners.

3.1.6.3 Permits

Permits of various types can provide details about specific construction on a property or modifications to an existing structure, such as: where construction occurred; when renovations were made to a structure, and what the renovations consisted of; whether AST and UST systems were installed or removed; and, other items that may be of use during the assessment.

Neither the Client nor the Project Site owners provided a copy of any current or historical permits for this assessment.

3.1.6.4 Production and Maintenance Records

Production and maintenance records can detail historical specifics about the manufacturing processes that occurred at a site and where those processes occurred within a facility. Likewise, maintenance records can detail when equipment was serviced, when breakdowns were repaired, and what was the cause of the breakdown. These records could especially be important if the reason for maintenance activities was a unit leaking petroleum or chemical products.

Neither the Client nor the Project Site owners provided a copy of any maintenance records for this assessment; however, no facilities are known to have existed on the Project Site that would have created such records.

3.1.6.5 Asbestos Surveys

Previously completed asbestos surveys can provide detail as to: the materials that historically existed at the site; the quantities estimated; determinations as to whether

ACM is present; what is the current condition of the ACMs; and, document whether the materials have been removed or repaired.

Neither the Client nor the Project Site owners provided a copy of any asbestos survey records for this assessment. It does not appear that any buildings have been constructed on the property by the current or former property owners.

3.1.6.6 Project Site Utility Drawings

Project Site utility drawings can provide detail regarding the utilities that currently or historically existed at the site, the pathway or footprint of the utilities, where the utilities are buried, and whether any abandoned historical utilities are present.

Neither the Client nor the Project Site owners provided a copy of any utility drawings for this assessment; however, no structures are known to have existed on the Project Site that would have required such drawings.

3.1.6.7 Emergency Response or Contingency Plans

Emergency response or contingency plans can detail specifics about the manufacturing processes that occurred at the site and where those processes occurred within a facility historically. Especially important if petroleum products or hazardous chemicals, or the processes in which they are used, were present. Likewise, emergency response or contingency plans can detail where petroleum products and hazardous chemicals are stored, maximum quantities of chemicals or petroleum products on the premises, historical hazardous petroleum and chemical uses, and what to do in an emergency at the facility.

Neither the Client nor the Project Site owners provided a copy of any emergency response or contingency plans for this assessment; however, no facilities are known to have existed on the Project Site that would have required such plans.

3.1.6.8 Spill Reporting Plans and Records

Spill reporting plans and records can detail specifics about the potential for spills at a facility, the chemical and petroleum compounds stored there, as well as records of spills that have occurred historically.

Neither the Client nor the Project Site owners provided a copy of any spill reporting plans or records for this assessment; however, no facilities are known to have existed on the Project Site that would have required such plans.

3.1.6.9 Worker Hazardous Materials Information System Records

WHMIS records can detail specifics about the hazardous chemicals and petroleum products that are present within a facility.

Neither the Client nor the Project Site owners provided a copy of any WHMIS records for this assessment; however, no facilities are known to have existed on the Project Site that would have required such records.

3.1.6.10 Material Data Safety Sheets

MSDSs can detail specifics about the chemicals and petroleum products that are present within a facility, including the toxicity, health hazards, storage, first aid treatment, and many other items associated with the chemicals and petroleum products.

Neither the Client nor the Project Site owners provided a copy of any MSDS records for this assessment; however, no facilities are known to have existed on the Project Site that would have required such records.

3.1.6.11 Environmental Monitoring Data

Environmental monitoring data can often be found at sites with an existing RMP in place, under the current environmental regulations in Alberta. The RMP often requires annual sampling, or sampling on a more frequent basis, as a required component of the RMP, so that existing site conditions may be monitored with respect to the prior release of a hazardous substance. Additional situations that may require environmental monitoring data could include approvals, discharge permits, or annual monitoring requirements.

The Project Site does not have an existing RMP in place, or other regulatory monitoring requirements, nor were any environmental monitoring points identified that indicated any previous sampling had occurred; therefore, environmental monitoring data is not applicable for the Project Site.

3.1.6.12 Waste Management Records

Waste management records can detail the specifics of the waste storage, transportation, and disposal process, including: types of waste, quantities, methods of transportation, and the final disposal or recycling destination. While this is a more important detail for manufacturing or service facilities, noting that good historical records and processes are in place can assure an Assessor that disposal has not occurred on the site, or that it illegally occurred with respect to regulated materials, even if disposal was not on the site.

Neither the Client nor the Project Site owners provided a copy of any waste management records for this assessment; however, no facilities are known to have existed on the Project Site that would have required such records.

3.1.6.13 Aboveground Storage Tank and Underground Storage Tank Inventory Records

If a location contains ASTs or USTs, inventory records can help to determine the quantity of fuels or chemicals that have been used at a site, or that have passed

through the site for retail sale. Inventory discrepancies, such as the volume purchased versus the volume sold, could help to determine how much fuel has been lost to leakage or spillage and that can potentially affect the Project Site. This information is especially useful if the site is a bulk fuel plant, chemical plant, or a retail fuel service station.

The Project Site does not currently have any ASTs or USTs present, nor is it an operating service station, chemical plant, manufacturing plant, or other facility with a need for ASTs or USTs. Therefore, neither AST nor UST inventories were acquired. Neither the Client nor the Project Site owners provided a copy of any AST or UST inventory records for this assessment.

3.1.6.14 Environmental Audit Reports

Environmental audit reports can detail the petroleum and chemical constituents stored on a property, if there are any outstanding environmental issues related to the property, as well as processes that use the chemical and petroleum products.

Neither the Client nor the Project Site owners provided a copy of any environmental audit records for this assessment; however, no facilities are known to have existed on the Project Site that would have required such records.

3.1.6.15 Prior Relevant Reports and Studies

Prior relevant reports and studies completed on a property can provide valuable historical information about a Project Site. These reports may contain: historical documentation unavailable to the current Assessor; historical information or resources that are no longer available or no longer exist from other sources; historical company information; sampling or monitoring actions that were completed for a business that is no longer in operation; the potential for contaminant migration; and, the differing point of view of a previous Assessor, which can all lead to a better understanding of the condition of the Project Site.

The Client provided two relevant reports for this assessment, while the Client's prior consultant provided copies of nineteen separate and possibly relevant reports or studies for this assessment; however, many of those studies were completed on an adjacent property to the east and only five were applicable to the Project Site. A discussion of the five relevant reports is included below. Locations discussed in the following sections may be viewed on Figure 2.

3.1.6.15.1 Geotechnical Evaluation

The first document provided by the Client is a *Geotechnical Evaluation* completed by McIntosh Lalani Engineering Ltd. in April of 2008 for MMM Group Limited. The report covered four contiguous quarter sections, an area of approximately 260 hectares, including the Site. Therefore, the Project Site (Location 1) was only a small part of the larger report.

The report authors indicated that nine boreholes were completed on the Site to a depth of approximately 9m and the soils sampled for standard geotechnical parameters. The boreholes then had a slotted PVC standpipe installed within them to collect groundwater level measurements during the following week. Eight of the nine boreholes that had been placed on the Project Site had water level elevations taken on two separate occasions. A water table elevation for the Site appears to be found between 1,012 and 1,015 masl with the groundwater flow appearing to flow from the northeast to the southwest. The soils consisted of organic topsoil across the Site, underlain by glacial tills that were comprised of silts or sandy silts, which in turn was underlain by silty clays. Occasionally, a sand deposit was identified. Sandstone or siltstone bedrock was found to have underlain the Site.

The report did not identify any environmental concerns. A copy of the report may be found in Appendix F1.

3.1.6.15.2 Netook Crossing Geotechnical Assessment

The second document provided by the Client is a *Geotechnical Assessment* completed by Watt Consulting Group in draft form as of 19 March 2024, for B&A Planning Group. The report specifically covered the Project Site (Location 1) and indicated that 27 boreholes were completed on the Site to a depth of approximately 6m, with the exception of BH23-04, which reached refusal at very shallow depths.

The soils were sampled for standard geotechnical parameters and piezometers were installed in each completed location. Groundwater level measurements were taken on multiple occasions after the installation of the piezometers since early February 2024 and prior to the publication of this draft report. Twelve of the 27 locations were found to be dry and a maximum water table elevation for the Site from the remaining locations appears to be found between 1,013.8 and 1,016.3 masl with the groundwater flow appearing to flow from the northeast to the southwest.

The soils consisted of organic topsoil across the Site from 0.2 to 0.3m, underlain by glacial tills that were comprised of silty clays. Occasionally, a sand deposit was identified. It should be noted that a silty sand deposit approximately 3m thick was identified in BH23-14, which is located in the approximate location of a previously identified ground disturbance that will be discussed in later sections. These silty sand deposits were also identified in BH23-15 and BH23-17(approximately 3m in thickness), and BH23-18 through BH23-21, as well as BH23-23, BH23-24, BH23-26, and BH23-27, which were all approximately 1.5m in thickness. No mention of bedrock was noted in the soil boring logs; however, the draft text implied that the silty clay till was found until highly weathered bedrock was reached.

The report did not identify any environmental concerns. A copy of the report may be found in Appendix F2.

3.1.6.15.3 Phase I Environmental Site Assessment

The first document provided by the Client's former consultant is a *Phase I ESA* completed by Base Property Consultants Ltd. (Base) in April of 2008 for Brown & Associates Planning Group. The Phase 1 ESA consisted of the review of four quarter sections; the Project Site (Location 1) and three quarter sections to the east, prior to Highway 2.

Findings of the Phase I ESA identified an oil or gas well on the Project Site that was drilled in 1978 but failed to produce. The well was immediately abandoned. Concerns related to this location included the potential for sumps and pits to be associated with this drilling operation.

The Phase 1 ESA also noted an active oil and gas well approximately 600m south of the Site (Location 8) and a gas station that had been operated since at least 1966 a full quarter section to the east of Location 5.

The Phase 1 ESA further noted a detached double garage, mobile home, and an animal shelter on the Project Site (their identification as SE3) as a part of the site reconnaissance and interviews, with the remainder being agricultural; however, no detail can be found regarding this information in the write up. The only mention of a detached garage is in reference to SE2, the quarter section east of Location 5. Not further references are found regarding the animal shelter or the mobile home. It is suspected that the earlier reference to SE3 is a typo.

A copy of the report may be found in Appendix F3.

3.1.6.15.4 Phase II Environmental Site Assessment

The second document of note provided by the Client's consultant is a *Phase II ESA* report completed by Base in October of 2008 for Brown & Associates Planning Group. The Phase II ESA consisted of the review of specific areas of two quarter sections; the Project Site (Figure 5, Location 1) and quarter section to the east of Figure 5, Location 5, which housed a service station, prior to Highway 2.

Thirty-five boreholes were placed on a 15m grid pattern centered on the expected location of the well head, in an attempt to locate the sump, flare pit and the well head. Two of the boreholes were converted into monitoring wells. Most of the boreholes were drill to 2m, while two were drilled to 4.5m.

Findings of the Phase II ESA identified a loam overlying a silt and sand, which overlaid an olive clay till. Only two of the 35 sample locations were submitted for analysis; locations E3-8 and E9-5a (See Figure 3 of the referenced report). The referenced figure does not appear to show overlap, or possible minimal edge overlap with the Project Site marathon Well location (Figure 5, Location 1B). There does not appear to be any information in the report to indicate from what depth these samples were

collected, other than on the soil boring logs themselves (Appendix B or the referenced report).

Samples were reportedly analysed using USEPA Method 624, which is a volatile screen with higher detection limits than the Method 8260, which was the standard for the time and had much lower levels of detection. Additionally, the samples were not analyzed for PHCs F1-F4, PAHs, or salinity. The two metals analyses reported seemed to be consistent across both samples.

A single groundwater sample was collected from location E3 and was also analyzed using USEPA Method 624. Even though results for metals in the groundwater are provided in the report, the actual data does not appear to be present. Page 2 of the groundwater analytical report (Pages 1 and 3 from the fax) appears to be missing. It should be noted that the groundwater results indicate many of the metals analyses were run with detection limits above the guideline standards; therefore, it is impossible to tell if the guidelines were exceeded for metals such as arsenic, selenium, and uranium.

A copy of the report may be found in Appendix F4.

3.1.6.15.5 Phase 1 Environmental Site Assessment

The third and final document provided by the Client's consultant is a *Phase 1 ESA* completed by Athena Environmental Consultants Ltd in November of 2021 for B&A Planning Group. The Phase 1 ESA covered a quarter section to the northeast of the Site (Locations 3 and 4). No issues were identified that could be associated with the Site.

A copy of the report may be found in Appendix F5.

3.1.7 Geological and Geotechnical Reports

Prior geological and geotechnical reports completed on a property can provide valuable historical information about soil and water conditions at a Project Site. These reports may contain: historical documentation unavailable to the current Assessor; historical information or resources that are no longer available or no longer exist from other sources; historical company information; sampling completed for a business that is no longer in operation; information about the Project Site geology, information about the Project Site building foundation requirements; and, the differing point of view of a previous Assessor, which can all lead to a better understanding of the condition of the Project Site and the potential for contaminant migration through the site soils and bedrock via groundwater or other mechanisms.

Prior geological or geotechnical reports associated with the Project Site or surrounding properties, other than those found within the ESAR Database (see Section 3.1.2.3) or provided by the Client (see Section 3.1.6.15), were not discovered during the review.

3.1.8 Regulatory Information

A regulatory review of publicly available information was completed for the Project Site. The review consisted of a compilation of federal, provincial, and local database resources, which identified sites with the potential to be sources of environmental issues and concerns.

3.1.8.1 Environmental Risk Information Services Databases Search

The ERIS database search identified sites of potential concern within a 300m radius of the property boundaries. Basic information from the report identified that the Project Site lies at an elevation of 1,020 ± m. The Project Site itself was identified six times and properties within 300m were identified four times within the searched databases.

A copy of the report, including a complete listing of the searched databases, can be found in Appendix G. Only those databases that identified positive findings are included in the following sections.

3.1.8.1.1 Alberta Environment and Protected Areas - Environmental Site Assessment Repository

The Alberta EPA ESAR database is a compilation of environmental site assessment, remediation, and reclamation documents that have been submitted to Alberta EPA for sites within Alberta. While the submittal of Phase I ESAs to Alberta EPA is not required, they are often found within the ESAR database. Phase II ESAs, remediation activities, and any sampling activities are required to be submitted to Alberta EPA for inclusion within the ESAR database. Copies of select ESAR documents that are important and applicable to this Phase I ESA can be found in Appendix D, as the Assessors independently checked the ESAR database prior to the receipt of the ERIS report.

The information from this database was current as of July 2023. The search results identified two records for the Site, which were duplications of the information discussed in Section 3.1.2.3.

3.1.8.1.2 Alberta Private Sewage Disposal Permits

The information from this database was current as of 2013. This database contains private sewage disposal permits issued to owners and contractors. Disposal systems may include holding tanks, septic tanks, packaged treatment plants, sand filters, fields, mounds, lagoons, and open discharges.

The database identified three records covering two sites within a 300m radius of the Project Site. The properties included:

- **226IJD-08-S0081– Reported Within The Project Site**
- **226IJD-03-S0021– Approximately 267m east of the Project Site**
- **226IJD-05-S0047– Approximately 267m east of the Project Site**

The properties with significant information are further discussed below.

3.1.8.1.2.1 Permit No.: 226IJD-08-S0081

The permit is reportedly associated with the Project Site (Location 1) and was mapped as Site 4 in the ERIS report to be in the SE portion of the quarter section; however, locating Site 4 by the coordinates NE-3-33-1-W5 as shown would place the site associated with the permit in the adjacent northern quarter section (Location 2), which is outside of the Project Site. The permit was issued on 31 October 2008. No further information was available for this location, including location specifics; however, it is assumed that it is related to facilities at the Old Golf Club.

3.1.8.1.2.2 Permit No.: 226IJD-03-S0021

This permit is identified by coordinates NW-02-33-01-W5, which is located to the northeast (Locations 3 or 4, or unnamed residential properties along Range Road 12) of the Project Site and east of the Olds Golf Course (Location 2). Although it is stated that the location is approximately 267m east of the Project Site, it has been mis-located in the database and is actually located adjacent and east of the Olds Golf Course. It is likely associated with the farmstead structures (Location 3) immediately northeast of the Project Site. The permit was issued on 14 July 2003.

3.1.8.1.2.3 Permit No.: 226IJD-05-S0047

This permit is also identified by coordinates NW-02-33-01-W5, which is located in northeast (Locations 3 or 4, or unnamed residential properties along Range Road 12) of the Project Site and east of the Olds Golf Course (Location 2). Although it is stated that the location is approximately 267m east of the Project Site, it has been mis-located in the database and is actually located adjacent and east of the Olds Golf Course. It is likely associated with the farmstead structures (Location 3) immediately northeast of the Project Site. The permit was issued on 28 November 2005.

3.1.8.1.3 Alberta Energy Regulator – Well Licenses

The information from this database was current through August 2023. The AER has defined the AERW as a listing of well licenses that includes active, suspended, abandoned, drilled, and cased wells for oil, gas, and crude bitumen. Additionally, observation, injection, disposal, and undefined wells licenses are also included.

The database information identified two records covering a single site (Location 1B) within a 300m radius of the Project Site. The properties included:

- **MARATHON CDN-SUP OLDS 7-3-33-1**
- **Repsol Oil & Gas Canada Inc. (0039)**

Properties with additional significant information are further discussed below.

3.1.8.1.3.1 MARATHON CDN-SUP OLDS 7-3-33-1

This location is listed as being within the Project Site (Location 1B). Information that was included in the report indicates that the license was granted in October 1978 and

that the well has been abandoned. An abandonment date was not given. The well was drilled to a total depth of 2,780.0 m with a final date of drilling on 29 December 1978. The well was certified as having been reclaimed and the licensee is identified as Repsol Oil & Gas Canada Inc. Additional details for license number 0072245 may be found in Appendix G.

3.1.8.1.3.2 Repsol Oil & Gas Canada Inc. (0039)

This location is listed as being within the Project Site (Location 1B) and appears to reference the same site as above. Information that was included in the report indicates that the license was granted in December 1998. Additional details for license number 0072245 may be found in Appendix G.

3.1.8.1.4 Alberta Water Well Information Database

The WWIS is a curated by Alberta EPA, containing over a half a million records. While some site locations are specific and accurate, others are located to within a quarter section. This database includes information from historical well logs, beginning as far in the past as 1880 and is current through August 2023.

The database information identified four wells within a radius of 300m. Well information included specifics on some or all of the following: drilling, well abandonment, water chemistry, and the owners. The properties included:

- **Well ID 416138**
- **Well ID 416139**
- **Well ID 409796**
- **Well ID 2043714**

3.1.8.1.4.1 Well ID 416138

This location is listed as Map ID 2, Record 1 of 2 in the ERIS report and being within the Project Site (Location 1B). The well is listed as being at an elevation of 1,020 m and was identified as a new well for industrial use. The well was drilled on 13 November 1978 to a depth of 142 feet (43.25m). The static water level appears to have been approximately 90 feet (27.5m) bgs during a 1978 pump test. The records show that the well was owned by Canadian Superior.

3.1.8.1.4.2 Well ID 416139

This location is listed as Map ID 2, Record 2 of 2 in the ERIS report and being within the Project Site (Location 1B). The well is listed as being at an elevation of 1,020m and was identified as a new well for industrial use. It can be inferred from the information that this is the same well as previously described, but is a new record related to the new well's decommissioning, after not producing the water needed.

3.1.8.1.4.3 Well ID 409796

This location is listed as Map ID 5 in the ERIS report and is approximately 219.4 m south – south east of the Project Site. The well is listed as being at an elevation of

1,018 m and as having a depth of 135 feet (41m) bgs. It was identified as a new well for domestic and stock use, drilled in December 1978 with the owners of record being R.M. and Joyce K. Alexander. The static water level appears to have been approximately 90 feet bgs during a 1979 water sampling and chemical analysis testing.

3.1.8.1.4.4 Well ID 2043714

This location is listed as Map ID 6, in the ERIS report and is approximately 266.6 m east – north east of the Project Site and identified as the South Test Well. The well is listed as being at an elevation of 1,019m and as having a depth of 200 feet (61m) bgs. It was identified as a new well for domestic use drilled in November 2021. The static water level appears to have been at approximately 7.5 feet (2.3m) bgs during a 2021 pump test. The well was backfilled from 100 feet (30.5m) to 200 feet (61m) bgs with hydrated bentonite chips.

3.1.8.2 Alberta Environment and Protected Areas – Authorization Viewer

The Alberta EPA Authorization Viewer (including the *Traditional Agricultural Registration Viewer* and the *Public Notices Viewer*) provides information and documents related to approvals, licenses, registrations, authorizations, permits, and certificates issued under the *Water Act* and the *Environmental Protection and Enhancement Act*.

A review of the Project Site quarter section, SE 03-033-01-W5M, did return two historical results for issued authorizations under the Water Act or EPEA, and null results for both the *Traditional Agricultural Registration Viewer* and the *Public Notices Viewer*. A copy of the null results may be found may be found in Appendix H.

3.1.8.2.1 Document 00122969-00-00

One record was identified as Document 00122969-00-00, which is a Reclamation Certificate dated 31 May 1979 for the former oil and gas well drilled on the Project Site (Location 1B). A copy of the approval notice may be found may be found in Appendix H1.

3.1.8.2.2 Document 00223038-00-00

The second record was identified as Document 00223038-00-00, which is an expired EPEA Approval held by Paramount Resources (ACL) Ltd. for the LONEPINE WEST TORRINGTON GATHERING SYSTEM PIPELINE PROJECT. A copy of the approval notice may be found may be found in Appendix H2. Additionally, a copy of the expired pipeline approval, may be found may be found in Appendix H2.

3.1.8.3 Alberta Environment and Protected Areas - Water Well Information Database

The WWIS is a database curated by Alberta EPA, containing over a half a million records. The records in this database are now searched via the ERIS database search and reported under a subsection of Section 3.1.8.1 (ERIS Databases Search) if any records are found.

Four records associated with the WWIS were identified in the ERIS search for the area within 300m of the Project Site.

3.1.8.4 Alberta Environment and Protected Areas – Historical Environmental Enforcement Search

The HEES is a new database curated by Alberta EPA that contains historical records of actions taken against a company or individual, related to Alberta EPA enforcement actions for failure to follow legislation requirements. A search of the database for several different names and companies associated with the Project Site provided no significant results. Those names and companies included:

- **Richardson Bros**
- **Neufield**
- **1273927 Alberta**
- **Olds Golf**
- **Marathon**
- **Repsol**

The searches for Richardson Bros, Marathon, and Repsol produced from one to three result; however, all were unrelated to the Project Site or surrounding areas. Copies of the relevant search results may be found in Appendix I.

3.1.8.5 Alberta Energy Regulator – Compliance Dashboard Searches

The Compliance Dashboard demonstrates how the AER is involved in incident response, investigations, compliance, and enforcement and includes information that is already publicly available through the *Freedom of Information and Protection of Privacy Act*. The AER is presenting this information online, in an easily accessible manner, to further increase the transparency of the regulator's activities.

The AER's incident reporting provides Albertans with information about energy incidents in the province. When it appears that a company has not followed AER requirements, the regulator takes steps to stop the noncompliant activity, restore the environment, and, if necessary, apply enforcement action against the responsible party. The AER completes investigations to determine all of the facts necessary to render an enforcement decision and works hard to ensure that this process is timely, fair, and transparent. The noncompliance and enforcement tab contains information starting from July 2014. Copies of the relevant search results may be found in Appendix J.

The responses reported include the following:

- enforcement decisions, such as warning letters, administrative penalties, and prosecution;
- administrative sanctions (e.g., imposition of terms and conditions);

- directions of an inspector in relation to section 137(2)(c) of the *Environmental Protection and Enhancement Act*;
- orders issued to compel compliance or remediate;
- any notice of noncompliance that is related to a full or partial suspension of operations;
- suspension or cancellation of an approval; and,
- cancellation of a reclamation certificate.

The same suite of names and companies identified within the HEES were input into this database, to search for any incidents Appendix J1, investigations Appendix J2, or non-compliance and enforcement issues Appendix J3. None of the queried names produced a hit for the Project Site, indicating a record in the system.

3.1.8.6 Freedom of Information and Protection of Privacy Act

Two types of information are routinely available from Alberta EPA with respect to information requests. Information subject to the *Freedom of Information and Protection of Privacy Act* and scientific or technical information available under the *Environmental Protection and Enhancement Act*.

Other entities, such as the Town of Olds, may have their own policies for the categorization of information in FOIP requests. FOIP requests may include internal documents or correspondence that is not routinely available, while information that would normally be acquired from requests under EPEA may generally already be included within the ESAR database, which is publically accessible via the internet. Records available under either request will generally take up to 30 days to process. A copy of the FOIP correspondence, if it exists, may be found in Appendix K.

3.1.8.7 Environmental Law Center

The ELC supplies information associated with the Alberta EPA environmental enforcement history of individuals and companies under EPEA and charges a fee to access this information. Since the ERIS database search did not indicate any potential enforcement issues in the three separate enforcement databases that it includes, there was not any reason to suspect an enforcement action at the Project Site, or on any of the surrounding sites.

Additionally, Bifröst completed an Alberta EPA HEES Search, as discussed in Section 3.1.8.4, and no significant records were found. Therefore, the ELC database was not accessed.

3.1.8.8 Petroleum Tank Management Association of Alberta/Alberta Safety Codes Authority

The PTMAA/ASCA has several databases that are accessed through the ERIS report and a listing and description of these databases can be found in the *ERIS* report *Appendix: Database Descriptions*. The *Fuel Storage Tank* database of PTMAA uses

information collected according to Alberta Regulation AR 291/95: *Storage Tank System Management* and to AR 52/98: *Fire Code*.

Since the ERIS database search did not indicate any potential AST or UST issues for the Project Site, there was no reason to suspect an AST or UST at the Project Site and a PTMAA/ASCA database search request was not conducted. A copy of the search request correspondence (if applicable) may be found in Appendix L.

3.1.8.9 Alberta Energy Regulator – Abandoned Well Map Viewer

The AER *Abandoned Well Viewer* allows the user to visually, by map location, locate and identify oil and gas wells that have been abandoned and are no longer producing, or have never produced. Use of the viewer identified a single well on the Project Site, located in the northwestern quadrant (LSD 7) of SE 3-33-1-W5M. The well is identified as being owned by Peyto oil & Gas Corp. No further information was available regarding the well, other than that the well was reclamation certified and some information on the owner's address.

The viewer did identify a potential wetlands or water body located in the far northwestern corner of the Project Site. A copy of the applicable section of the map has been included in Appendix M.

3.1.8.10 Mountain View County – Land Use

The County of Mountain View web-based records were searched for records related to the zoning land use bylaws and maps within the area. The *Land Use Bylaw* (dated 21 June 2023) and the associated *Land Use Maps* (31 October 2023) were referenced for this document.

Zoning for the Project Site itself is identified as, A: Agricultural District, and then along the northern margin of the Project Site, R-CR: County Residential District.

Adjacent land use zoning to the north was identified as, P-PCR: Parks and Recreation District. Areas to the east, southeast, south, southwest, west, and northwest of the Project Site are also identified as, A: Agricultural District.

A copy of the applicable local zoning bylaw maps has been included in Appendix N.

3.2 Optional Records Review

Optional records are those records that may, according to the CSA standard, be reviewed by the Assessor and, which are necessary to provide an accurate and thorough picture of the history of the site. A discussion of a particular record was included in this report, even if a null result was identified.

3.2.1 Geological and Soil Maps

A technical review of the Project Site's bedrock and surficial geological setting was completed by inspecting bedrock geology maps, surficial geology maps, soil maps, flood plain maps, and hydrogeological maps, if they existed. To expedite the collection and review of data, much of the physical setting and subsurface information was collected via an ERIS *Physical Setting Report*. A copy of the ERIS *Physical Setting Report* may be found in Appendix O.

3.2.1.1 Bedrock Geology Maps

The bedrock geology of a location can help to identify physical characteristics of a site area, including the general permeability of the various rock units, which allows the user to interpret the potential flow direction of groundwater, as well as the potential lateral and vertical spread of contamination, should it exist.

Bedrock under the Project Site consists of alluvial sandstone, siltstone, and mudstone of the Paleogene Paskapoo Formation.

The ERIS *Physical Setting Report* does not appear to indicate a relative bedrock elevation below the existing Project Site surface.

3.2.1.2 Surficial Geology Maps

The surficial geology of a location can help to identify physical characteristics of a site area, which then allows the user to interpret the potential for the surface drainage, permeability, and source minerals. This then allows the user to potentially interpret the horizontal and vertical spread of contamination, should any exist.

The surficial geology under the Project Site consists of Pleistocene fluted moraine, which is identified as primarily till and local stratified glaciolacustrine or glaciofluvial sediments. Landforms will be parallel to the local ice flow direction and vary from furrows, ridges, and smoothed hills. Includes flutes, drumlins and drumlinoids.

3.2.1.3 Soil Maps

The surficial soils identified at a particular location can help to determine the physical characteristics of a site area, which then allows the user to interpret the potential for the permeability and leachability of liquids, mineral and organic content, clay content, acidity, and other factors that can help to determine the potential for the migration of contaminants.

There are two distinct soil types within the project site. Roughly one third of the site to the north is covered with soil represented by Polygon ID: ABD192012864 and two thirds of the site in the south covered in soil represented by Polygon ID: ABD192012956.

The soils of Polygon ID: ABD192012864 are identified as being comprised of 50% each of the Antler and Lonepine soil profiles, which are classified as mineral tills. Specific

details on the soil includes that it is well drained, slightly stony and does not have a root restricting layer. An average breakdown of the soil composition is 34% sand, 42% silt, and 24% clay. The soil contains 4.75% organics in the upper 20 cm.

The next 40 cm is nearly the same, at 34% sand, 42% silt, and 24% clay. The difference being that this interval of soil contains 3.25% organics in the 20 – 40 cm layer.

The soils of Polygon ID: ABD192012956 are identified as being comprised of 60% Antler, 20% Didsbury, and 20% miscellaneous Gleysol soil profiles, which are classified as mineral tills. Specific details on the soil includes that it is well drained, slightly stony and does not have a root restricting layer. The breakdown of the Antler soil composition that makes up the majority of the soil profile is 25% sand, 45% silt, and 30% clay in the upper 20 cm. The soil contains 4% organics in this interval. The next 40 cm is nearly the same, at 25% sand, 45% silt, and 30% clay. The difference being that this interval of soil contains 1.3% organics.

3.2.1.4 Floodplain Maps

Floodplain maps can identify areas where it is expected that flooding will have a 1% chance of occurring during any one calendar year. These areas of potential flooding are known as a 100-year flood zones. Areas of concern on the maps include the floodway (main area flooded during a 100-year flood), the flood fringe (areas of slower water movement and that are shallower, due to the height of the land above the floodway), and areas of overland flow.

The floodways and flood fringes surrounding the Site near Olds are marked on the Alberta Flood Awareness Map and an accurate measurement can be made of the potential flood risk. The Project Site is not near any body of water that may pose a flood risk. The nearest permanent body of water is a water retention pond located approximately 400m to the southwest of the Project Site, across Highway 27.

The Project Site is currently outside of any 100-year flood zone or flood fringe associated with any body of water. The map does not show a 500-year flood zone, but it is expected that the Project Site lies outside of any such defined area, due to its local elevation when compared to the nearest water body.

A copy of the Alberta Flood Awareness Map applicable to the Project Site can be found in Appendix P.

3.2.1.5 Hydrogeologic Maps

Hydrogeologic maps can identify areas where wetlands or other surface water features may be found and hence, where the user can interpret the potential for contaminants to affect the Aquatic Life Pathway found under the *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*.

The Project Site has some minor wetlands just outside of the northeastern and northwestern corners.

The Project Site is currently outside of any classified or defined wetland areas, and well outside of the 300m buffer for most surface water bodies with the exception of an open water body approximately 400m to the southwest, and some areas defined as marshes to outside of the northeast and northwest corners of the property. However, the Project Site itself formerly had a larger wetland in the northwestern corner, as well as another wetland located in the north-central portion of the property, which now appear to have either been removed, are intermittent, or they have dried up. The representative map applicable to the Project Site can be found in Appendix O, within the ERIS Physical Setting Report.

3.2.2 Topographic Maps

In addition to generalized information concerning topography, topographic maps can be used to identify local features that are no longer present, buildings and other structures that were historically present but have been torn down, large-scale features such as landfills, and can also be used to determine elevation changes between maps of varying years.

The Toporama topographic map used for this report was published by Natural Resources Canada in July of 2013, and had not been updated with all of the most recent local construction. The Project Site is centered on the map at an elevation of approximately 1,020m and is identified to be within an area undeveloped at the time of the map's publication, with the exception of Highway 27 immediately south of the property.

The area surrounding the Project Site is also shown as generally undeveloped. Copies of the applicable topographic maps may be found in Appendix O.

3.2.3 Sale and Purchase Agreements

Sale and purchase agreements for a piece of property can identify specific features related to a site, such as environmental liabilities, escrow accounts for future clean up and remediation work, groundwater well installation restrictions, areas where ground disturbance is forbidden, and other useful items that may not be identified through a land title search or search of other documents, if these items or restrictions are not yet attached to a title.

The property is not identified as for sale. The previous purchase agreement was not provided to Bifröst by the Client or the current owners.

3.2.4 Land Use Documents

Land use documents, including zoning maps, detail the type of structures and occupancy of an area, whether it may be residential, commercial, industrial, mixed, or some specific variation on one of the primary zoning uses. This is important because under the *Alberta Soil and Groundwater Remediation Guidelines* (Alberta Tier 1 and Tier 2), the specific land use determines the amount of residual contamination that may be left in place on a piece of property before it becomes a health hazard that needs remediation, or risk management and monitoring.

The County of Mountain View does have a land use map that was discussed in Section 3.1.8.10.

3.2.5 Public Health Concerns

AHS is responsible for compiling information regarding health issues and infractions within the various communities of Alberta. Generalized information that may come from AHS include suspected cancer clusters, suspicion of “sick building syndrome”, and other environmentally related health issues, such as food preparation facilities.

Due to a lack of facilities at the Project Site that would fall under AHS jurisdiction, the AHS website was not searched for any type of enforcement order or other notice.

3.2.6 Utility Company Records

Utility company records are often acquired when potentially PCB-containing transformers are identified on a site. The utility company that owns the transformers is then contacted to determine whether the transformers have been sampled previously for PCBs.

As will be discussed in Section 4.1 (Exterior Inspection), there were not any pole-mounted wet transformers of any type identified on the Project Site, nor were there any pad-mounted dry transformers. Utility company records, if they are applicable, may be found in Appendix Q.

3.2.7 Local Information Sources

Local information sources can include public libraries, historical societies, or municipal archives, as well as other public information sources. These sources often contain historical publications, newspaper clippings, photographs, books, and artifacts that are cataloged and organized so that a particular address may be identified along with the year the information was published.

As sufficient information has been found through the normal mandatory and optional records searches, additional local information sources, were not searched for information during the assessment.

3.2.8 Other Helpful Information

Additional sources of helpful information other than the local information sources listed above, can come from many different sources, some of which are identified below.

3.2.8.1 Environmental Audit reports

Public environmental audit reports can detail the petroleum and chemical contents of a facility located on a property, as well as if there are any outstanding environmental issues related to the property.

Public environmental audit reports for the Project Site were not provided by the Client, the Project Site owners, or found through a search of other public sources.

3.2.8.2 Public Health Notices

AHS is responsible for compiling information regarding health issues and infractions within the communities of Alberta. For example, public health notices may be issued for a restaurant that has failed an inspection.

Public health notices for the Project Site, if they were searched for, are discussed under Section 3.2.5 (Public Health Concerns). No additional public health notices were found through a search of other public sources.

3.2.8.3 Well Logs

Well logs can help the Assessor determine the underlying soil and rock characteristics, as well as help to determine at what depth groundwater may be first encountered, or if there is an aquifer beneath a site.

The well log review was associated with the ERIS review of the Alberta EPA – WWIS database, as described in Section 3.1.8.1 (ERIS Databases Search). No additional well logs were found through a search of other public sources.

3.2.8.4 Waste Disposal Sites Inventories

Waste disposal site inventories can help to determine the contents of landfills or other material burials that may be nearby and could potentially affect the Project Site. This information is especially useful if the site is large enough that a company buried wastes on its own property.

No official areas of burial or landfilling are anticipated to exist on Project Site and waste disposal site inventory reports for the Project Site were not provided by the Client, owners, or found through a search of other public sources. However, as an oil and gas well was drilled on the property, there is the potential for buried wastes to be associated with these operations.

3.2.8.5 Polychlorinated Biphenyls Storage Site Inventories

PCB storage site inventories can help to determine the location and quantities of PCBs that may have passed through, or been present on a site, and could potentially affect the Project Site. This information is especially useful if the site is large enough that a company stored or handled many large transformers on its own property.

No areas of PCB use or storage are anticipated to exist on Project Site. Finding public PCB storage site inventories would be extremely helpful; but, no PCB storage site inventories were found through a search of other sources.

3.2.8.6 Coal Gasification Plant Inventories

Coal gasification is a process where coal was converted into a gas that was used to provide municipalities with light and heat prior to the development of techniques to produce natural gas. Gas plant inventories can help to determine the quantity of coal and coal tars produced, where the processes and waste piles were located, where if any coal tars were disposed (possibly on-site), and if any of the above could potentially affect the Project Site. This information is especially useful if the site is large enough that a company buried wastes on its own property.

No areas of coal gasification are anticipated to exist on the Project Site, nor are there any known coal gasification plants immediately upgradient of, or adjacent to, the Project Site. Finding public coal gasification plant inventories would be extremely helpful; but, no coal gasification plant inventories were found through a search of other public sources.

3.2.8.7 Historical Tank Inventories

AST and UST inventories can help to determine the quantity of fuels or chemicals that have been used in processes at a site, or that have passed through the site for retail sale. Inventory discrepancies, such as the volume purchased versus the volume sold, could help to determine how much fuel has been lost due to leakage or spillage and that could potentially affect the Project Site. This information is especially useful if the site is a manufacturing facility, bulk fuel plant, chemical plant, or a retail service station.

The Project Site has never been an operating service station or chemical company and no records have been found regarding regulated USTs or ASTs. Therefore, neither AST nor UST inventories were acquired for this report.

3.2.8.8 Environmental Media Quality Data

Under the current environmental regulations, the most common occurrence of environmental media quality data can often be found at sites with an existing RMP in place. The RMP often requires annual sampling, or sampling on a more frequent basis, as a required component of the RMP, so that existing site conditions may be monitored with respect to the prior release of a hazardous substance.

The Project Site does not have an existing RMP in place, nor were any environmental monitoring points identified that indicated any previous sampling. Finding environmental media quality data in a public record other than ESAR would be extremely helpful; but, no environmental media quality data were found through a search of other public sources.

3.2.8.9 Historical Waste Generation Registries

Historical waste generation registries can help to determine the location and quantities of wastes that may have passed through, or been present on a site, and could potentially affect the Project Site. This information is especially useful if the site is large enough that a company stored or handled large quantities of wastes on its own property.

Wastes were generated on-Site associated with the drilling of the oil and gas well on LSD 7; however, it is unclear whether these wastes were disposed of on site. No historical waste generation registries exist that were identified in the public record. Therefore, waste generation registries were not acquired for this report.

3.2.8.10 Prior Environmental Reports and Studies

Like prior Phase 1 ESAs, prior environmental reports and studies completed on a property can provide valuable historical information about a Project Site. Resources unavailable to the current Assessor, resources that are no longer publically available, personal information, sampling completed on a neighboring business, and sampling completed on a business that is no longer present, can all lead to a better understanding of the condition of the Project Site.

The existence of prior environmental reports and studies for the Project Site, or surrounding properties, other than those found on the ESAR Database search (see Section 3.1.2.3), or provided by the Client (see Section 3.1.6.15), is unknown. The exception is that ERIS, through their database service (see Section 3.1.8.1), may identify that other Phase I ESAs exist in the immediate area; however, copies of these documents would not available. It would not be known who were the producers or Clients of these reports.

Finding environmental reports in a public record other than ESAR would be extremely helpful; but, no environmental reports were found through a search of other public sources than those previously described.

3.2.8.11 Google Street View

A Street-view search of the Project Site and surrounding properties was available, only for the southern property boundary along Highway 27. Various views of the Project Site are shown (R1 – R3), documenting its current agricultural usage. Images of the surrounding sites to the east (R4), south (R6 and R7), and west (R8) are captured, also

indicating their current agricultural usage, with the exception of the farmstead in images R5 and R6.

A copy of the retrieved images (if applicable) can be found in Appendix R.

3.2.8.12 Other Web-based Records

Other web-based records were found with respect to the Project Site.

Mountain View County maintains a database of Environmentally Significant Areas. A screen shot of the Project Site indicates that there are not any Environmentally Significant Areas associated with the Project Site.

A reference search for the keywords “Olds Golf Club” within Alberta identified several references to this adjacent northern property. No newsworthy environmental events have occurred within this property to the north of the Project Site or have been incorporated into local social media or the news, which would indicate that the site had been involved in anything significantly detrimental with respect to the environment.

A copy of the retrieved information (if applicable) can be found in Appendix S.

4.0 SITE INSPECTION

The site inspection allows the Assessor to view the site and surrounding properties for evidence of current or historical environmental conditions that might affect the property, now or in the future. The assessment is generally broken up into four parts: the exterior inspection of the site; the interior inspection of the site; the inspection of the surrounding adjacent parcels from the right of way, or the site itself; and, the inspection of surrounding properties not adjacent to the site. The last part may extend out to an indeterminate distance based upon the judgement of the Assessor, but generally will cover the area within a 300m radius of the site itself. Figure 3 is a diagram of the Project Site, while Figure 4 is a Project Site drawing showing detailed points of interest, or items of significance. Figure 5 is a drawing of the Project Site and surrounding properties of identified potential environmental concern, with their identification for later discussion. A copy of the photographs taken during the assessment can be found in Appendix T.

4.1 Exterior Inspection

The exterior inspection includes the exterior surface of the building, any ancillary structures, the parking areas, landscaping, site roadways or other direct means of travel between adjacent points on the property, and any undeveloped or natural areas of the site, including areas of water. While there, the Assessor inspected the exterior of the Project Site for evidence of environmental liabilities, or the evidence of past environmental liabilities.

4.1.1 Property Use

The accessor, Ms. Wendy Thorne, of Bifröst Environmental and Remediation Services Inc., arrived at the Project Site on 21 November 2023, to assess the Project Site and surrounding parcels for evidence of environmental liabilities associated with the properties.

The Project Site consists of a quarter section of land, SE-3-33-1-W5M comprised of two parcels. One parcel consists of Bock A, a thin strip along the northern portion of the quarter section, with a larger area comprising the western end, totalling approximately 3.40 hectares. The second parcel consists of the remainder of the property, approximately 154 hectares. The property may be found in the northwestern corner of the intersection of Highway 27 and Range Road 12. The lots are described in detail in the following sections. Photographs 1 – 17 discuss the Project Site (Locations 1, 1A, 1B, and 1C).

4.1.1.1 SE-3-33-1-W5M

The lands comprising the quarter section (Location 1) consisted of agricultural lands with a recent corn crop that had been harvested (Photograph 1). This land also includes the areas designated as Locations 1B and 1C, which are the former Marathon Lease on LSD 7 and the suspected lease area located on LSD 8, respectively.

Site access was from three locations. The first vehicle access point was 100m north of the southeastern corner of the Project Site along Range Road 12 (Photograph 2); the second was adjacent to the northeastern corner of the property, also along Range Road 12 (Photograph 3); and, the third was located off of Highway 27 near the southwestern corner of the Project Site (Photograph 4). There were no fences on the property and ditches were present adjacent to all four property lines. The ditches appeared to contain grasses and other vegetation (Photograph 5); the northern portion of the western ditch was covered in trees (Photograph 6). Only the northern ditch appeared to contain any water (Photograph 7). The remainder of the Project Site may be described as seen in Photograph 1; cultivated agricultural field.

In the southwestern corner of the Project Site was a sign indicating the presence of a water line crossing (Photograph 8). A nearby sign indicated the presence of a buried fiber optic cable (Photograph 9). A culvert was present in this area, within the southern ditch. Multiple signs indicated the presence of a buried telephone cable along the eastern property boundary (Photograph 10).

A groundwater monitoring well (Photograph 11) and separate standpipe (Photograph 12) were observed in the approximate center of the Project Site. The monitoring well consisted of 5 cm diameter PVC, with a metal protective casing. The casing lid did not close completely, so the PVC was visible. The immediate area surrounding the well and standpipe was covered with grass, indicating that it had been avoided during farming operations and had therefore, been present for some significant amount of time.

4.1.1.2 Block A

The lands comprising Block A (Location 1A) consisted of agricultural lands with a recent corn crop that had been harvested. Access into Block A is from the northeastern corner of the Project Site (Photograph 2) and includes a strip of land that runs along the northern property boundary to the northwestern corner (Photographs 13 through 15). This is not the lane that accesses the property to the north. This area includes all of the drainage ditch along this northern boundary.

There was what appeared to be a pump house (Location 2) adjacent to the northern portion of the northwestern corner of the Project Site; however, this was off of the Project Site (See Section 4.1.2.1). A water pipe led south from the pump house and then below the surface of the ditch along the western Project Site property line (Photograph 16). Power lines were located along the western property boundary, on the western side of the adjacent ditch (Location 10) as shown in Photographs 5 and 8, and then along the southern property boundary, on the northern side of the southern ditch (Location 1), as shown on Photograph 17.

4.1.2 Observation of Neighboring Properties

The properties surrounding the Project Site were observed from the property, public access areas, and existing roads and right of ways. Each of the adjacent properties is

discussed below, as are significant properties located at a greater distance from the Project Site, which potentially could have an effect on the property. The neighboring properties were all either agricultural lands or farmsteads with the exception of the property to the north, which was the Olds Golf Club. If available, addresses, zoning, and occupants are noted below, beginning with the properties to the north:

Table 3 – Observations of Neighboring Properties

Direction	Address	Zoning	Photograph Number/Comments
North			
Location 2	33042/33642 Range Road 12	Parks and Recreation District; P-PR	18-31; Golf course north and adjacent to the Project Site.
Northeast			
Location 3	Range Road 12	Agricultural; A	32; Farmstead northeast and adjacent to the Project Site.
Location 4	Range Road 12	Agricultural; A	32; Agricultural fields northeast and adjacent to the Project Site, via an access road off of Range Road 12.
East			
Location 5	Range Road 12	Agricultural; A	33; Agricultural fields east and adjacent to the Project Site.
Southeast			
Location 6	Range Road 12	Agricultural; A	34; Agricultural fields southeast and adjacent to the Project Site.
South			
Location 7	Highway 27	Agricultural; A	35; Farmstead south and adjacent to the Project Site.
Location 8	Highway 27	Agricultural; A	36; Agricultural fields south and adjacent to the Project Site.
Southwest			
Location 9	Highway 27	Agricultural; A	Agricultural fields southwest and adjacent to the Project Site.
West			
Location 10	Highway 27	Agricultural; A	37; Agricultural fields west and adjacent to the Project Site.
Northwest			
Location 11	Unknown	Agricultural; A	Agricultural fields northwest and adjacent to the Project Site.

Observations of the properties adjacent to the Project Site, as well as selected properties at greater distances away (if applicable), are discussed in the following sections (Photographs 18 – 37).

4.1.2.1 Olds Golf Club

The adjacent land (Location 2) to the north of the Project Site appear to be accessible by a paved roadway and driveway. The site has access off of Range Road 12 and is listed at the address 33642 Range Road 12, based upon signage in front of the site (Photograph 18).

An unpaved entrance to the site maintenance facility was located approximately 20m west of Range Road 12 on the north side of the driveway. Two green solid waste dumpsters were seen at the end of this entrance, with berms and trees blocking the view of other items in this area (Photograph 19). A small parking lot was located on the west side of this unpaved entrance driveway to the maintenance facility.

Approximately 125m west of Range Road 12 was a second earthen entrance into the maintenance facility (Photograph 20). This entrance had cement “Lego” blocks stacked two rows high on the left side of the road with more on the right behind an earthen berm that ran parallel to the main driveway into the course. It appears that several sea can storage containers were present on the northern and western side of the rear lot, as well as two structures on the eastern side. There also appeared to be at least two fuel ASTs (Photograph 21), located within the yellow sea cans. This area also contained miscellaneous equipment and materials.

A gated entrance was located approximately 80m west from Range Road 12 down the main entrance driveway to the course. An asphalt paved parking lot was located west of the Range Road entrance at a distance of approximately 350m. The asphalt surface was in poor condition and appeared to be sloped to the south.

At this same location on the southern side of the driveway was fallow area consisting of cattails and other vegetation (Photograph 22). The east portion of the ditch appeared to drain south into an area of the Project Site characterized by a slightly lower grade than the surrounding area, and the presence of hydrophilic species such as cattails and sedges. These indicate the long-term presence of a high water table in the drainage ditch. The beginnings of a wet drainage ditch headed west from this location (Photograph 23).

To the north of the parking lot and approximately 410m from Range Road 12 was the course clubhouse (Photograph 24). The southern side of the parking lot contained several light poles on concrete pads, spaced at a distance of approximately 50m apart. A power pole with a pole-mounted transformer was located on the southern side of the parking lot at a distance of approximately 450m from Range Road 12 (Photograph 25). It appeared that the electric reached the pole from overhead lines coming in from the west, while a cable was noted to have been secured to the pole and to the

underground. This was the likely source of power to the lights surrounding the parking lot.

At a distance of approximately 480m from Range Road 12 was another structure that appeared to be a golf cart storage and battery charging building (Photograph 26). This was assumed, based upon the number of carts located outside of this structure. There also appeared to be at least one fuel AST (Photograph 27) located on the western side of the structure, near the northwestern corner of the building. A shed and other miscellaneous lawn care equipment were also located in this area. It is assumed that the fuel AST was used for the lawn equipment. Mulch and soil were stockpiled on the western side of the parking lot west of the maintenance structure.

An unpaved gravel and earthen road began at a distance of approximately 520m from Range Road 12 and continued to head west. Portions of the road appeared to be salt encrusted. Overhead power lines were located on the southern side of this path, as were numerous debris piles (Photograph 28).

There was what appeared to be a pump house (Photograph 29) adjacent to the northwest corner of the Project Site at a distance of approximately 780m from Range Road 12. This pump house was adjacent to a larger pond that was located on the golf course property. A power pole was adjacent to the pump house, while a second pole, which contained a pole-mounted transformer (arrow), was located further to the west towards the edge of the property. There appeared to be the remains of a concrete retaining wall (Photograph 30) on the southern side of the gravel road, north of the drainage ditch.

The pump house had a blue pipe that exited the structure and immediately went underground to the east. An electric meter was located on the southern side of the structure. A black pipe, assumed to be a water pipe, was visible in the grass approximately five meters to the southwest of the pump house (Photograph 31). It was unclear whether the pipe ended at this location or went underground to the north. The piping exited to the southwest, across the drainage ditch and then south, underground, along the western property line of the Project Site.

4.1.2.2 Farmstead

Northeast of the Project Site was a farmstead (Location 3) that was accessible by a U-shaped roadway to the east (Photograph 32). Several horses were seen grazing in this area near Range Road 12 and north of the southern portion of the U-shaped roadway. The area contained a wind break comprised of coniferous trees that were oriented east and west. Nothing of environmental significance was noticed on this property that was visible from the public right of way.

4.1.2.3 Agricultural Lands

The lands (Location 4) immediately to the northeast of the Project Site were all harvested agricultural lands behind the farmstead associated with Location 3 (Photograph 32). No visible signs of extensive wastes or debris were observed from the public right of way along Range Road 12.

4.1.2.4 Agricultural Lands

The lands (Location 5) immediately to the east of the Project Site were all harvested agricultural lands (Photograph 33). No visible signs of extensive wastes or debris were observed from the public right of way along Range Road 12.

4.1.2.5 Agricultural Lands

The lands (Location 6) immediately to the southeast of the Project Site appeared to be harvested agricultural lands (Photograph 34) with a wind break comprised of coniferous trees that was visible along both Highway 27 and Range Road 12. Nothing of environmental significance was noticed on this property that was visible from the public right of way along Range Road 12.

4.1.2.6 Farmstead

The land (Location 7) immediately to the south of the Project Site along the eastern end was a farmstead (Photograph 35). The site (arrow) was surrounded by large conifers along Highway 27 and only a structure was visible from an opening where the driveway to the site entered from the highway. No visible signs of extensive wastes or debris were observed from the public right of way along Highway 27.

4.1.2.7 Agricultural Lands

The lands (Location 8) immediately to the south of the Project Site were all harvested agricultural lands (Photograph 36). No visible signs of extensive wastes or debris were observed from the public right of way along Highway 27 or from the Project Site.

4.1.2.8 Agricultural Lands

The lands (Location 9) immediately to the southwest of the Project Site were all either harvested agricultural lands or fallow field. No visible signs of extensive wastes or debris were observed from the public right of way along Highway 27 or from the Project Site.

4.1.2.9 Agricultural Lands

The lands (Location 10) immediately to the west of the Project Site were all harvested agricultural lands (Photograph 37). No visible signs of extensive wastes or debris were observed from the Project Site.

4.1.2.10 Agricultural Lands

The lands (Location 11) immediately to the northwest of the Project Site were all harvested agricultural lands. No visible signs of extensive wastes or debris were observed from the Project Site.

4.1.3 General Topographic, Geologic, and Hydrogeologic Conditions

The observed physical features of the Project Site included the following observations.

4.1.3.1 Topographic Conditions

The topography of the Project Site, in general, was relatively level, with the exception of the drainage ditches that surrounded the property.

Clearly, the Project Site has been modified for development and any original, topographic variation has been modified and eliminated, with the exception of a slight, general natural slope to the south providing drainage.

4.1.3.2 Geologic Conditions

No local geologic exposures were found on the Project Site that allow for the physical determination of the local geologic conditions other than the surface soil observed. However, based upon the general lay of the Project Site and surrounding properties, the Project Site appears to lie on a relatively flat glacial till plain. All apparent surface materials consist of unconsolidated glacial deposits and topsoil.

4.1.3.3 Hydrogeologic Conditions

Hydrogeologic conditions are unknown, except that the property to the north did contain several ponds (Location 2).

4.1.4 General Description of the Project Site

The Project Site is currently comprised of a two parcels; Block A and the remainder of SE-3-33-1-W5M. No structures were present on the Project Site, other than surface expressions of the subsurface utilities, a monitoring well, and a piezometer, mentioned in Section 4.1.1.1.

4.1.5 Hazardous Materials

No hazardous materials were observed on the Project Site.

4.1.6 Unidentified Substances

No unidentified substances were observed on the Project Site.

4.1.7 Storage Tanks

Storage tanks can come in all kinds of shapes and sizes, can be manufactured from various types of materials, and can be either be placed above or below ground. No storage tanks of any type were observed on the Project Site.

4.1.8 Storage Containers
No storage containers of any type were observed on the Project Site.

4.1.9 Stains
Stains were not observed on the Project Site.

4.1.10 Odours
Unusual odours were not detected on the Project Site.

4.1.11 Wells
Wells were not observed on the Project Site, other than the monitoring well and piezometer, previously described in Section 4.1.1.1.

4.1.12 Sewage Disposal
Neither sanitary sewer nor septic systems were immediately identified on the Project Site.

4.1.13 Pits, Ponds and Lagoons
Pits, ponds, or lagoons were not observed on the Project Site, other than the previously mentioned drainage ditches.

4.1.14 Stressed Vegetation
Stressed vegetation was not observed on the Project Site.

4.1.15 Fill
It is unclear whether fill has been placed on the Project Site; however, there were not any obvious signs that fill had been brought in.

4.1.16 Waste Water
No waste water infrastructure was identified other than the surrounding drainage ditches. It is assumed that normal overland flow to these ditches occurs during rain events.

4.1.17 Watercourses, Ditches, or Standing Water
No water courses, other than the previously identified drainage ditches surrounding the Project Site, were identified.

4.1.18 Roads, Parking Facilities, and Rights of Way
As discussed previously, the Project Site sits on the northwestern corner of the intersection of Highway 27 and Range Road 12. There were not any improved parking facilities on the property.

4.1.19 Potable Water Supply

No potable water supply was identified on the Project Site.

4.1.20 Utilities

As previously mentioned, utilities were identified on the Project Site on all four sides within the right-of-way. A discussion of these utilities can be found in Sections 4.1.1.1 and 4.1.1.2.

4.1.21 Special Attention Items

Special attention items include various building materials, construction compounds, or naturally occurring items that either, currently, or formerly, were used in the construction of buildings or are present in buildings, and were later found to pose a risk to human health or the environment. Production or use of each of these items were discontinued in Canada, either through legislation, or standard, commercial practices. Generally, there may be an established date when the product should no longer be available or used in newer construction.

4.1.21.1 Polychlorinated Biphenyls

PCBs are highly stable and persistent chemical compounds with great heat transfer and insulation properties that were non-flammable, and would not catch fire or explode in the case of a spark. However, these same characteristics also made them very stable in the environment and they would not degrade if released via a spill. The compounds would then eventually be washed into river sediments, where benthic organisms ingest sediments contaminated with the compounds. These organisms were then eaten by others, and so on up the food chain, where eventually animals such as fish, mammals, and birds were identified to have high concentrations of the compounds in their tissue.

The *Environmental Contaminants Act* of 1975, which first limited the sale and use of PCBs, was replaced by the *Canadian Environmental Protection Act* of 1988 and subsequently by CEPA 1999. PCBs were phased out of heat transfer and electrical equipment by 1977 and from capacitors and transformers by 1980. Fluorescent light ballasts manufactured after 1979 do not contain PCBs. Other sources of PCBs may include the oils within hydraulic lifts and elevators.

In general, PCBs under the PCB Regulations (SOR/2008-273) are limited to uses in which the PCB concentration is less than 2 mg/kg for liquids or 50 mg/kg for solids, with timetables in place for an end-of-use deadline for greater concentrations.

At the time of the Project Site visit, no transformers or other potentially PCB-containing equipment were identified on the Project Site.

4.1.21.2 Asbestos-Containing Materials

Asbestos is a common name for six naturally occurring fibrous minerals that have been found to cause serious health effects in humans. Due to the mineral's heat-resistant

and insulating properties, asbestos was used in building materials such as roofing shingles, house siding, plasters and drywalls, ceiling tiles, fireproofing, sealants, floor tiles, felts, gaskets, wraps, and as pipe insulation. As late as 2012, asbestos was mined in Canada; however, while it has been phased out in some applications, such as drywall joint compounds in 1980, and spray–on fireproofing in 1989, via the *Hazardous Products Act* and the *Asbestos Products Regulations*, it is still being utilized in some building materials (cement piping and board) within Canada.

Any structure built prior to 1995 has a potential to contain asbestos and should be sampled prior to renovation or demolition. This date has been selected as it assumes that the existing inventories of building material stocks were used contrary to regulations for another five years.

The Project Site did not contain any structures on the property; therefore, asbestos is not a concern.

4.1.21.3 Lead

Most paints used prior to 1960 contained lead, and most exterior paints continued to contain lead until 1990. Some surface coatings as late as 2010 may continue to contain up to 90 mg/kg of lead. Lead may also be found in a variety of other products, including: batteries, cast iron pipe connections, counterweights, decorative pieces, flashing, glazing, glass, piping, solder, and many other uses.

Lead generally poses the most risk to children (as opposed to adults) when they inadvertently pick up lead dust on their fingers, which they then put into their mouth, or they pick up paint chips and ingest them. Lead piping or solder in piping joints in contact with a drinking water supply can also be a primary cause of high lead levels in the blood of children, as was exhibited in Flint, Michigan.

The Project Site did not contain any structures on the property; therefore, lead is not a concern related to building materials used on the property.

4.1.21.4 Ozone-Depleting Substances

Canada signed the Montreal Protocol on *Substances that Deplete the Ozone Layer* in 1987. The requirements of the Montreal Protocol to phase out ODS was implemented by the *Ozone-depleting Substances Regulations* of 1998. Refrigerants, including compounds like Freon, are found in cooling systems, such as air conditioners and refrigerators, and are considered ODS. While not a direct health threat to the individual, ODS released into the atmosphere breaks down the Earth's ozone layer and allow in more UV radiation. Therefore, it has been considered a global threat.

The Project Site did not contain any structures on the property; therefore, ODS-containing substances are not a concern related to building materials used on the property.

4.1.21.5 Radon

Radon is a colorless, tasteless, and odorless, naturally occurring radioactive gas that is produced by the decay of uranium in soil and rock. When the source of the radon lies underneath a home or other building, the gasses may accumulate under the slab or floor of the building and then enter the structure via holes, perforations, or cracks. If the radon gas is not vented to the exterior in some way, it can concentrate within the structure and potentially reach concentrations that may be harmful to humans. Radon is the leading cause of lung cancer in non-smokers.

The County of Mountain View lies within a radon hazard zone that is relatively high. According to the Radon Potential Map of Canada (Appendix U), the County of Mountain View lies within Zone 1, which is the zone of highest potential for radon. This is mainly due to the prevalence of radioactive materials in areas associated with mountains, the shallowness of the local bedrock in the area, as well as the erosion of mountain sediments that contain radioactive materials and the subsequent distribution of those sediments by glacial actions to other areas of the province.

The Project Site is located in Zone 1, which is identified as having a high, relative radon hazard potential; therefore, radon cannot be eliminated as a potential concern, especially if occupied structures are constructed in the future.

4.1.21.6 Urea Foam Formaldehyde Insulation

UFFI was used as a retrofit insulation, injected behind the walls of existing structures during the 1970s. The foam could be forced into small and inaccessible areas and has been extensively used in Europe for 30 years. During the curing process, after the injection of the foam, formaldehyde gas was often released. The gasses could also be released if the UFFI gets wet, and the insulation can be a reservoir for mold growth. It was banned by Canada in 1980.

The Project Site did not contain any structures on the property; therefore, UFFI is not a potential concern.

4.2 Interior Inspection

The Project Site did not contain any structures; therefore, no interior inspection was necessary.

5.0 INTERVIEWS

Interviews are conducted with persons who may have significant information on the history or activities at the site, including the Project Site Owners, tenants, other occupants, local city officials, government regulatory personnel, and others, as required. Stated answers to several questions have been incorporated throughout the document, where applicable.

5.1 Project Site Owners and Consultants

The Project Site Owners, as well as others, provided information during the assessment through phone conversations and correspondence. The contents of the interviews may be found in the following sections.

5.1.1 Mr. Greg Brown – Owner Representative, B&A Planning Group

Mr. Greg Brown of B&A Planning Group was contacted by Ms. Wendy Thorne of Bifröst on 4 December 2023. Ms. Thorne indicated that during her Project Site visit, she found what appeared to be a monitoring well and possibly a geotechnical borehole. Mr. Brown indicated that the parcel was purchased 15 years ago, but that the previous Site owners were still in the area. He indicated that he would contact the previous Site owners to find out if there were any reports associated with the geotechnical features.

He had also inquired with his geotechnical Project Manager, Mr. Joel Rombough of the Watt Consulting Group. Mr. Rombough, in his correspondence, indicated that they "…installed white PVC pipes in each borehole we drilled as part of our groundwater monitoring program." He further indicated that the larger red casing may have been installed during the 2008 ML (McIntosh Lalani Engineering Ltd.) investigation, but he wasn't sure. He indicated that they would look at it the next time that they went out to read the piezometers.

Further correspondence between Mr. Brown, and a Ms. Alanna Felske of Arletta Water Resources, indicated that Arletta had installed four test pits on the Project Site, which had been backfilled and that PVC standpipes had been placed in the test pits to monitor shallow groundwater. She further commented on the existing well casing that was found on the property.

Mr. Brown later supplied Bifröst with a copy of the 2008 ML Geotechnical Report. .

5.1.2 Mr. Joel Rombough – Watt Consulting Group

Mr. Joel Rombough of Watt Consulting Group was contacted by Mr. Mark A. Lehar of Bifröst on 11 January 2024. Mr. Lehar contacted Mr. Rombough as a follow up to his correspondence with Mr. Brown, regarding the new geotechnical work being completed at the Project Site.

Mr. Rombough indicated that his firm was completing additional geotechnical work on the Project Site to be in compliance with the County of Mountain View's newer requirements, which had been implemented since the previous 2008 geotechnical inspection completed by ML. Mr. Rombough indicated that they had drilled 27 boreholes on the Project Site, each to a depth of 6m. Standpipes were placed within all of the boreholes prior to backfilling, so that the shallow groundwater could be monitored per the County requirements. He indicated that the report detailing the results of the geotechnical investigation is in draft completion and should be available by the beginning of February.

It should be noted that previously, during the Project Site visit on 21 November 2023, Ms. Thorne encountered a representative from Watt Engineering (Watt Consulting Group) who indicated that he was conducting a survey of the Project Site, and mentioned the presence of the well and standpipe.

5.1.3 Ms. Alanna Felske – Arletta Water Resources

Ms. Alanna Felske of Arletta Water Resources was contacted by Mr. Mark A. Lehar of Bifröst on 11 January 2024. Mr. Lehar contacted Ms. Felske as a follow up to her correspondence with Mr. Brown, regarding the new geotechnical work being completed at the Project Site.

Ms. Felske indicated that her firm was completing shallow soil testing on the Project Site, which consisted of the installation of eight test pits. Four of the eight pits had PVC standpipes installed within them prior to backfilling, so that they could monitor the shallow groundwater and how it was impacted by the test pits. The draft report detailing the results of the test pit investigation is in completion and should be available by the beginning of February, after receipt of the geotechnical results.

5.2 Neighboring Properties

Adjacent property owners, provided information during the assessment through phone conversations, correspondence, and actual on-site interviews. The contents of the interviews may be found in the following sections.

5.2.1 Mr. Matt MacDonald – Olds Golf Club Representative

Mr. Matt MacDonald, the pro shop manager of the Olds Golf Club, was interviewed by Ms. Wendy Thorne of Bifröst on 21 November 2023. When asked about the Project Site, Mr. MacDonald indicated that he had only recently been employed by the course and was not familiar with any of the local history. He did not have any information regarding the history of the ASTs on the property.

6.0 EVALUATION OF INFORMATION

When looking at the sum total of the information gathered for the Project Site and surrounding properties, several things stand out with respect to actual or potential environmental liabilities. Each property address that was identified during the records review, site inspection, and interviews is discussed separately. Property locations are referenced in Figure 2, with the Project Site being identified as Location 1.

6.1 Project Site Discussion

The Project Site information that was obtained appears to indicate that the Project Site (Locations 1, 1A, 1B, and 1C) was originally agricultural land, pasture, or fallow vacant land prior to at least 1949. No development that includes structures has been identified on the property, with the exception of the temporary structures that had to have been associated with the installation of the Marathon oil and gas well in LSD 7 (Location 1B). There do not seem to be any actual significant issues of environmental concern related to the Project Site itself, based upon the information gathered.

However, the information gathered during the course of this assessment indicates that the Project Site did have an oil and gas lease upon it in LSD 7, which did include the drilling of a well. During the drilling of oil and gas wells, various chemicals and materials are used in its installation, and wastes of various types are produced. While no information has been found to indicate that drilling wastes were buried on the property, there is that real possibility that burying wastes on site was a standard practice during the time when the well was installed. This well does have a Reclamation Certificate (4445) associated with it, indicating that it was closed to the standards of the time (1979).

Visual evidence found during the review of the aerial photographs appear to indicate an area of possible alteration located within LSD 8 (Location 1C). The area does appear to have a road into it and is the approximate size and shape of a well lease. No information was found in the standard sources to indicate that a well had been installed at that location.

Figure 5 shows the properties of identified potential concern and are shaded.

6.1.1 Groundwater Flow

The geologic information for the Project Site and surrounding properties does not provide specifics regarding the actual groundwater flow onto, or under, the Project Site. However, geotechnical work completed by others for the Project Site seems indicate that groundwater can be found in some areas of the Project Site at depths above 6m, and perched water may be found in an area of sandy soil on the northern and eastern portions of the property. No definitive groundwater flow direction has been calculated.

6.1.2 Hazardous Materials

No hazardous materials were found at the Project Site, nor were any identified within the historical record; therefore, hazardous materials will be dropped from any further consideration.

6.1.3 USTs and ASTs

There were not any USTs or ASTs found on the Project Site during the inspection, nor were any identified within the historical record; therefore, USTs and ASTs will be dropped from any further consideration.

6.1.4 Special Attention Items - Asbestos

No buildings were present on the Project Site; therefore, asbestos will be dropped from any further consideration.

6.1.5 Special Attention Items - Lead

No buildings were present on the Project Site; therefore, lead will be dropped from any further consideration.

6.1.6 Special Attention Items - ODS

No buildings were present on the Project Site; therefore, ODS will be dropped from any further consideration.

6.1.7 Special Attention Items - PCBs

No buildings were present on the Project Site; therefore, PCBs will be dropped from any further consideration.

6.1.8 Special Attention Items - Radon

Because the area is identified as having a high, relative radon hazard potential, radon cannot be eliminated as a potential concern, especially if occupied structures are constructed in the future. However, radon testing can easily determine if radon is an actual concern. Additionally, structural designs that incorporate radon mitigation systems can easily eliminate radon, should it be determined to be a concern.

Special attention items such as radon, are of concern when structures made for occupation are constructed on a site, due to the natural conditions of the surrounding soils or groundwater. As previously mentioned, there is not a structure present on the property; however, indications from the Client indicate that a planned residential and other structures are be a possibility. Radon may be present due to the presence of uranium and radium in the area soils, derived from glacial till. It is a function of the local geology and ubiquitous to all areas of southern Alberta, although the levels of exposure may vary. **Radon will be carried forward to the conclusions.**

6.2 Off-Site Discussion

The information obtained for the off-site properties appears to indicate that none of them carry active or potential environmental liabilities with respect to the Project Site, other than Location 2, the Olds Golf Course. Figure 5 shows the off-site properties of identified potential concern. The properties below are generally ordered beginning in the north, and moving clockwise around the Project Site. Properties of potential environmental concern are shaded.

6.2.1 Location 2; Olds Golf Course (Adjacent to the Project Site)

The main issue associated with this site are the ASTs found during the Project Site inspection. These ASTs include: two very large ones in the maintenance area to the north, above the eastern side of the Project Site; and, a single AST located outside of the battery charging building. These ASTs may affect the Project Site if there are spills during filling operations associated with the ASTs, or if there is a catastrophic release from one of them, due to the slope of the land towards the Project Site. No secondary containment for these ASTs was identified during the assessment.

Additionally, there could potentially be larger quantities of acids used to recharge the batteries, lead from improperly disposed of batteries, and chemical and petroleum products associated with site maintenance activities.

The potential release of fuels from the ASTs during some type of accident remains the most pressing concern, without additional information to indicate other environmental liabilities.

6.3 Limitations

The process of completing a CSA Phase I ESA includes limitations designed into the CSA Standard. Additionally, significant limitations may exist with respect to the Project Site or surrounding properties related to various conditions.

The limitations specific to this CSA Phase I ESA include (as applicable): obscured areas of the Project Site, including areas underneath material stock piles, vehicles, storage containers, equipment, supplies, snow and ice, water, vegetation, and fixtures covering some areas of the ground surface. Limitations may have also been present associated with the neighboring properties for the above reasons, as well as excessive vegetation, snow, and ice cover that could hide potential environmental concerns.

6.4 Deviations

Deviations contained within this report include the failure to acquire titles back to Crown land, due to constraints within the project budget. However, based upon the information obtained from other sources, it is not believed that the purchase of this specific information would have added to anything not already found from other public sources. Additionally, interviews were not completed with public officials, as it is believed that the

historical report record is complete and the Project Site has been thoroughly documented.

7.0 CONCLUSIONS

In conclusion, based upon the records reviewed, Project Site inspection, interviews, and the evaluation of the discovered information, it is the opinion of Bifröst that the **CSA Phase 1 ESA has not identified evidence of actual contamination associated with the Project Site**. However, the Phase 1 ESA has identified evidence of potential contamination associated with the Project Site.

The Phase 1 ESA has also identified evidence of potential contamination associated with surrounding properties. This latter statement is qualified due to factors such as: distance to the contaminant source; the incomplete knowledge of the shallow water table under the full extent of the Project Site; a lack of solid information on the actual groundwater flow direction within the aquifer; and, incomplete knowledge of the types of chemical and petroleum contaminants historically present on the adjacent properties.

The rationale behind these conclusions are detailed below. Items or areas of concern associated with actual or potential contamination on the Project Site are identified on Figure 4. Sites in the immediate area of the Project Site that are noted to be associated with actual or potential contamination that may affect the Project Site may be found on Figure 5.

7.1 Project Site – Actual Contamination

No evidence of actual contamination was identified related to the Project Site. The evidence for (or lack of) contamination includes:

7.1.1 Soils

There is not any evidence of historical or current soil contamination associated with SE-3-33-1W5M near the town of Olds, Alberta.

7.1.2 Groundwater

There is not any evidence of historical or current groundwater contamination associated with SE-3-33-1W5M near the town of Olds, Alberta.

7.2 Project Site – Potential Contamination

There is evidence of potential contamination related to the Project Site. The evidence for (or lack of) potential contamination includes:

7.2.1 Soil

There is evidence of the potential for soil contamination associated with SE-3-33-1W5M near the town of Olds, Alberta. Specifically, this is related to known oil and gas well installation activities within LSD 7 (Location 1B), where spills may have occurred, or wastes associated with drilling activities may have been buried on the Project Site.

Additionally, visual evidence found during the assessment appears to indicate an area of possible alteration located within LSD 8 (Location 1C) that matches the size and shape of a well lease, where soil disturbances were also observed.

7.2.2 Groundwater

There is not any evidence of potential groundwater contamination associated with SE-3-33-1W5M near the town of Olds, Alberta.

7.2.3 Special Attention Items - Radon

No direct evidence was found during the assessment that special attention items such as radon were present on the Project Site; however, since radon is ubiquitous to the area and potentially present at elevated levels in all areas of southern Alberta, it cannot be discounted.

Specifically, the Project Site is located within Radon Zone 1, which, according to the Radon Potential Map of Canada (Appendix U), is the zone of the highest potential for radon. This is mainly due to the prevalence of radioactive materials in areas associated with mountains, the shallowness of the local bedrock in the area, as well as the erosion of mountain sediments that contain radioactive materials and the subsequent distribution of those sediments by glacial actions to other areas of the province.

Because the area is identified as having a high, relative radon hazard potential, radon cannot be eliminated as a potential concern, especially if occupied structures are constructed in the future. However, radon testing can easily determine if radon is an actual concern. Additionally, structural designs that incorporate radon mitigation systems can easily eliminate radon, should it be determined to be a concern.

7.3 Surrounding Properties – Actual Contamination

Evidence of actual historical contamination was not identified related to the surrounding properties.

7.4 Surrounding Properties – Potential Contamination

Evidence of potential contamination was identified related to the surrounding properties. This included the discovery of ASTs without apparent secondary containment located on the property immediately north and adjacent the Project Site, and a land surface that slopes from the ASTs towards the Project Site.

These conclusions may change based upon new information or more extensive investigation into additional surrounding properties.

8.0 RECOMMENDATIONS

It is the recommendation of Bifröst that additional investigation be completed. This additional investigation would be associated with both the known Marathon well located on LSD 7, as well as the suspected well lease located on LSD 8. This is important to note in that the construction of residential and other properties within this area, may potentially be affected by venting gasses from the former well, or the suspected well location.

Additionally, based upon the unknown final disposition of drilling wastes associated with the former Marathon well drilled in LSD 7, care should be taken during excavation of topsoil and subsoils in case drilling or other wastes may have been buried upon the Project Site.

9.0 ADDITIONAL ASSESSMENT

Based upon the recommendation that additional assessment should be completed on the Project Site, with respect to the known well found on LSD 7 and the suspected well on LSD 8, the following additional information was collected.

9.1 Tour Reports

A *Tour Request Order Form* was submitted to AER on 20 November 2023 to secure the tour report for the well located at 00/07-03-033-01W5/0. A copy of the Tour Report for Marathon Canadian – Superior 7-3-33-1 was received approximately one week later.

A review of the report indicated that the rig was set up on the lease site on 21 November 1978 by Mustang Drilling Ltd., the identified contractor for Marathon Petroleum Ltd. Temporary structures and mud tanks were placed on the lease site on 22 November 1978 and drilling began on 25 November 1978. Gel, caustic, lime, and soda, as well as other compounds, are some of the chemicals utilized during the drilling operations.

The borehole was completed to a total depth of 2,780m on 29 December 1978. Over the next week, the crew worked to clean out the hole and plug the borehole back to the target depth. On 2 January 1979, the rig tools became stuck in the hole after plugging back to 2,255m. They were able to recover to 2,025m and then became stuck again. Apparently, the head of the drilling string that had been stuck was blown off of the remaining rods to recover at least a portion of the drilling string.

An application to abandon the hole was made to the Energy Resources Conservation Board on 2 January 1979.

The drilling rig finished plugging the borehole with concrete and demobilized from the site on 6 January 1979.

9.2 Additional Records

After the 1985 aerial photograph was reviewed and it was shown to the outline of a potential lease and roadway on that portion of the Project Site, additional records were searched for through various sources on-line, including AbaData, Alberta EPA, the University of Alberta, Haliburton, and other potential web-based sources. A formal request to AER on 18 January 2024 related to the suspected well on LSD 8. Correspondence was received on the same afternoon indicating that AER did not have any record of a well at that location.

After permission was received from the Client to complete additional in-depth investigation, regulations around the suspected well were reviewed. The following paragraphs summarize these findings.

It was determined that the Client must follow the “Abandoned Well Locating and Testing Protocol”. This includes all reasonable efforts by the licensee (company that currently hold the licensing rights to the lease) to locate the well, and complete a gas detection survey (methane testing, at a minimum) and reporting.

Additionally, as H_2S (hydrogen sulfide) might be a factor, it was recommended that we locate documentation indicating that the well does not meet the definition of a "sour gas" well. This is important in that H_2S is a deadly gas that can be emitted by these wells.

The licensee is required to determine whether the well abandonment meets current requirements, and may need to re-abandon the well if it does not meet those requirements. They are eternally responsible for the well; therefore, future space and access needs should be developed during planning for the area around the well.

Legislation administered by the AER provides that the licensee of an abandoned well remains responsible for the well indefinitely. In the knowledge that they may need to get equipment in to work on the well, should the need arise.

The Subdivision Development Regulations (SDR) require that information be included regarding the abandoned well, including that from the AER abandoned well viewer and the licensee should be contacted for records and to physically locate the well. A copy of a screenshot of the AER abandoned well viewer may be found in Appendix M. The AER is aware that a number of wells abandoned prior to 1945 may be missing from their database.

AER recommends a minimum setback distance of 5 meters for an abandoned well, as long as it is not a sour gas well. Then the setbacks for a sour gas well are a minimum of 100m. While the likelihood is low that future access to an abandoned well will be needed for repairs, establishing and maintaining a greater setback than is required should be considered between the abandoned well and surface structures to allow well access with minimal disruption to surface structures, and prevent accidental contact of the construction equipment with the well. Applicants are strongly encouraged to address the need for a greater setback with the licensee before submitting their application to the municipality. Surface structures are not permitted to be built on top of an abandoned oil or gas well.

AER (as the old ERCB) recommended a setback consisting of a 20 metre by 35 metre work area surrounding the abandoned well back in 2010. The setback boundaries should be established so that the well is no less than 5 metres from the setback boundary. An 8 metre access to this setback area is also needed. So a road to access the well and then an area so that structures do not have to be removed. This would include houses, swimming pools, off-set garages, sheds, gardens, flowerbeds, etc.

Provision of an access route should be discussed between the applicant for subdivision or development approval and the licensee. The licensee of the well is expected to

determine whether there are any existing well integrity issues that need to be addressed prior to surface development taking place and whether the well was abandoned to an acceptable standard (to meet today's regulations). In order to minimize the chance that a well may leak once surface development occurs in proximity to the well, the licensee is strongly encouraged to consider re-abandoning the well to current standards prior to surface development taking place.

The SDR requires that applicants include in their application information from the AER identifying the locations or confirming the absence of any abandoned wells within the proposed project area. The information is to consist of the following:

- a map of the search area from the viewer and a statement that there are no wells in the project area;
- a list and map identifying the locations of abandoned wells within the search area, including the surface coordinates, as provided by the viewer or the Information Management Branch;
- written confirmation from the applicant for subdivision or development approval that the licensee responsible for each well has been contacted and the exact well location confirmed (any additional information discussed with the licensee that may have led to a change in the setback area should also be included);
- a sketch of the proposed development incorporating the necessary setback area for each well; and,
- if the development will result in construction activity within the setback area, a statement confirming that the abandoned wells will be temporarily marked with on-site identification to prevent contact during construction.

If applicants find abandoned wells within the project development area, the SDR requires them to contact the licensee.

Based upon the above information, it was decided to contact the licensee (Peyto Exploration & Development Corp.) regarding the need for gas migration testing in the area of the former Marathon well.

Additionally, it was decided that electromagnetic terrain conductivity (EM) and magnetometer (MAG) surveys on both the LSD 7 and LSD 8 sites would help to establish the presence or absence of metallic drilling piping that remains in place, as well as establish the well center, if such piping is present.

9.3 Electromagnetic Survey

After the 1985 aerial photograph was reviewed, there appeared to be visual evidence of the outline of a potential lease area and associated roadway on LSD 8. With this in mind, it was decided that both an EM and MAG survey would help to establish if drilling ever took place on that portion of the Project Site. Additionally, it was decided that since a known well was located on LSD 7, the results of the surveys could be readily

compared to determine if they were both consistent with drilling activities, or if LSD 8 lacked such features.

The instruments, a Geonics Ltd. EM-31 conductivity meter, as well as an Overhauser magnetometer, were deployed to the Project Site on 7 February 2024. The EM-31 indicates conductivity changes to a depth of approximately 4m, meaning that it is summing the conductivity changes from the surface to 4m. It is not providing a reading at 4m. The magnetometer reads changes in the total magnetic field and makes it ideal for detecting in place metallic objects.

A map showing the relative locations of the EM and MAG surveys may be found on Figure 6, while a copy of the full report completed by Focus Geo may be found in Appendix V.

9.3.1 Former Marathon Well on LSD 7

The results of the EM and MAG survey identified the location of the casing of the former well that Marathon drilled in 1978, which appeared to be consistent with known facts about the former well's location. A copy of the full report completed by Focus Geo may be found in Appendix V1.

9.3.2 Suspected Well on LSD 8

The survey did not find any significant EM or MAG anomalies in the area of LSD 8, which is a line of evidence that oil or gas well drilling may not have ever taken place in this location. The results indicated that the soils in the area of the observed disturbance may be sandy, and could offer an explanation as to why the ground appeared to lack vegetation in some of the aerial photographs.

These conclusions also appear to coincide with the information gathered from the geotechnical soil borings. While the soil boring information was not available prior to the completion of the survey, it does provide another line of evidence to reasonably explain the soil disturbance in the area.

A copy of the full report completed by Focus Geo may be found in Appendix V2.

9.4 Methane Survey

As discussed in Section 9.2, it is the responsibility of the licensee (Peyto) to make all reasonable efforts to locate the well, complete a gas detection survey (methane testing, at a minimum), and reporting. On sites where wells were known to have been installed, but the exact location may be questionable, the licensee must follow the "Abandoned Well Locating and Testing Protocol".

This protocol is reasonable for the location of the former Marathon well located in LSD 7; however, there was never any definite documentation to suggest that a well had ever

existed on LSD 8, only the inference associated with what appeared to be former lease outlines and a roadway observed in the 1985 aerial photograph.

Based upon these facts, Peyto hired Capstone Oilfield Services Ltd. (Capstone) to complete gas migration testing for the former Marathon well located on LSD 7. To be consistent with in the general approach, Bifröst then also hired Capstone, upon approval of the Client, to complete gas migration testing on LSD 8, in the center of the suspected lease area.

A map showing the relative locations of the gas migration testing surveys may be found on Figure 7, while a map overlaying the relative locations of the gas migration testing data on a 60m by 60m grid, with samples collected on every other 1m grid square, may be found on Figure 8. A copy of the full reports completed by Capstone may be found in Appendix W

9.4.1 Former Marathon Well on LSD 7

The methodology used by Capstone to locate the former Marathon well location included contracting McElhanney to identify the specific well center location within the lease area. This work was completed on 12 March 2024 using a Fuji 960 pipeline and cable locator.

After the well was located, Capstone proceeded to complete the work using AER Directive 079 Guidance and Capstone testing protocols on 11 May 2024. The surface was first scanned using an IR LMD (infrared laser methane detector) to determine atmospheric methane concentrations and then three background soil samples were collected. Atmospheric methane was determined to be 2 ppm, while background soils were averaged at 3 ppm, between the three locations. It should be noted that the report indicates that background is 2 ppm.

Gas migration testing on the surface was conducted in a 6m radius around the well center in the four cardinal directions (N, S, E, and W), as well as splitting each of the cardinal directions and taking another reading (NE, SE, SW, NW). One sample was collected in each direction at a distance of 1m past the previous sample, out to a distance of 6m.

All readings were recorded at 2 ppm.

A small hole was then drilled to a depth of between 15 and 30 cm and a probe inserted to collect a subsurface methane reading, at the same locations and distances as the surface readings.

Most readings varied between 2 and 7 ppm, with additional readings at 11, 17, 28, and 45 ppm. Each of the higher readings were isolated and they were not grouped, other than being less than 6m from the well center. Each of the higher readings lay on a separate cardinal radial (NE, E, SW, and N, respectively).

The Capstone report concluded that gas migration was not suspected. A copy of the full report completed by Capstone may be found in Appendix W1.

9.4.2 Suspected Well on LSD 8

The methodologies used to search for methane migration on the suspected well site were a combination of Capstone field procedures used for data collection, along with a grid location and modification of the AER procedures by Bifröst.

As previously indicated, on sites where wells were known to have been installed, but the exact location may be questionable, the licensee must follow the “Abandoned Well Locating and Testing Protocol”. For a site where a well was known to exist but the exact location is unknown, a search using a 1m by 1m grid is required under the Directive 079.

However, there was never any definite documentation to suggest that a well had ever existed on LSD 8; only the inference associated with what appeared to be former lease outlines and a roadway observed in the 1985 aerial photograph.

With this understanding of the facts in mind, it is understood that Directive 079 does not fully apply to the situation on the Project Site around LSD 8; however, it would be in the best interests of all parties to remain as true to the intent as possible. Therefore, to cover as much area as possible around the center of the suspected well lease on LSD 8, it was decided that a 2m by 2m sampling grid would be applied over an area approximately 60m on a side, giving us maximum coverage for the area most likely to house a well, if one were present. If high readings were identified in a particular area, the 1m grid cell between two other readings could also then be taken.

Capstone proceeded to complete the work as described above for their field procedures and using the Bifröst modified Directive 079 test protocols on 11 March 2024. As before, the surface was first scanned using an IR LMD to determine atmospheric methane concentrations and then three background soil samples were collected. Atmospheric methane was determined to be 2 ppm, while background soils were averaged at 2 ppm, between the three locations.

Gas migration testing on the surface was conducted on a 60m square grid as described above. One sample was collected at the starting corner and then every 2m until the final distance was reached. This was repeated for each row.

All readings were recorded at 2 ppm.

A small hole was then drilled to a depth of between 15 and 30 cm and a probe inserted to collect a subsurface methane reading, at the same locations and distances as the surface readings.

Most readings were less than the detection limit of 2 ppm, which is the background atmospheric concentration. The vast majority of actual detections varied between 3 and 39 ppm. Of the approximately 1,000 subsurface sample methane readings taken: 23 were found within the 40 – 69 ppm and 12 were found to be above 70 ppm.

The majority of the elevated detections (greater than 49 ppm) were found to be present within one of three clusters. The first cluster was found to be located in the northwestern corner of the surveyed area and was found to be possibly associated with an area of the Project Site that is normally wetter. If quantities of buried vegetable matter are located in this area, it may be a safe assumption that the low methane readings are produced by decaying vegetation.

The second cluster is located in the west-central area of the surveyed grid and contains five hits above 49 ppm, but below 70 ppm. The third cluster is located in the central portion of the surveyed area and would potentially correspond with a well, had it been drilled in the approximate center of the suspected lease area. This area contained 15 results between 70 and 120; however, none of the results are necessarily connected by isopleths of similar concentration. While clustered in general, the concentrations are scattered within the concentrated area. This could be reflective of permeability differences in the soils or may be reflective of once again, decaying vegetative matter.

Were a leaking well to have existed at this location, according to Capstone, we should be experiencing methane readings in the upper hundreds if not the thousands of ppm at multiple locations.

The Capstone report concluded that gas migration was not suspected. A copy of the full report completed by Capstone may be found in Appendix W2.

9.5 Project Site Concept Plan

A Concept Plan, which has been prepared by others, is being used as a layer over the base map for Figure 9. This figure is a summary map of the important features and areas of investigation associated with the Project Site and laid onto the Concept Plan. A copy of the original Concept Plain may be found in Appendix X.

10.0 FINAL DISCUSSION

The additional detailed assessment completed by Bifröst did not find any evidence of a well having been installed on LSD 8. Records were found through AbaData, AER, Alberta EPA, and other sources that indicated that a well had been installed by Marathon on LSD 7 in 1978. The same well was also found to have been listed as reclaimed in 1979 through the ERCB.

The geophysical surveys completed clearly identified the former Marathon well casing; however, no such target was identified on LSD 8.

The methane survey for LSD 7 did not find any evidence for a methane release from any source; however, the total diameter of investigation around the well center was only 12m. The methane survey for LSD 8 covered an area of 60m by 60m and identified several locations that may be associated with decaying vegetation or other potential sources of low methane emissions.

11.0 FINAL CONCLUSIONS

The additional detailed assessment completed by Bifröst did not find any evidence of a release of gasses from the former Marathon well located in LSD 7. Nor was evidence found that would indicate that a well was installed on LSD 8.

No further assessment is required for SE-03-33-01-W5M, based upon the current level of knowledge regarding the known LSD 7 location or the suspected LSD 8 location.

11.1 Project Site – Actual Contamination

There remains no evidence of actual contamination related to the Project Site. The evidence for (or lack of) contamination includes:

11.1.1 Soils

There is not any evidence of historical or current soil contamination associated with SE-3-33-1W5M near the town of Olds, Alberta.

11.1.2 Groundwater

There is not any evidence of historical or current groundwater contamination associated with SE-3-33-1W5M near the town of Olds, Alberta.

11.2 Project Site – Potential Contamination

There is evidence of potential contamination related to the Project Site. The evidence for (or lack of) potential contamination includes:

11.2.1 Soil

There is evidence of the potential for soil contamination associated with SE-3-33-1W5M near the town of Olds, Alberta. Specifically, this is related to known oil and gas well installation activities within LSD 7 (Location 1B), where spills may have occurred, or wastes associated with drilling activities may have been buried on the Project Site.

Additionally, visual evidence found during the assessment appears to indicate an area of possible alteration located within LSD 8 (Location 1C) that matches the size and shape of a well lease, where soil disturbances were also observed.

Further investigation of this area using geophysical means, as well as a methane survey, indicate that there is no evidence of a well having been drilled on this location. Therefore, the potential for contamination has been significantly minimized related to the installation of a well on this portion of the Project Site.

11.2.2 Groundwater

There is not any evidence of potential groundwater contamination associated with SE-3-33-1W5M near the town of Olds, Alberta.

11.2.3 Special Attention Items - Radon

No direct evidence was found during the assessment that special attention items such as radon were present on the Project Site; however, since radon is ubiquitous to the area and potentially present at elevated levels in all areas of southern Alberta, it cannot be discounted.

Specifically, the Project Site is located within Radon Zone 1, which, according to the Radon Potential Map of Canada (Appendix U), is the zone of the highest potential for radon. This is mainly due to the prevalence of radioactive materials in areas associated with mountains, the shallowness of the local bedrock in the area, as well as the erosion of mountain sediments that contain radioactive materials and the subsequent distribution of those sediments by glacial actions to other areas of the province.

Because the area is identified as having a high, relative radon hazard potential, radon cannot be eliminated as a potential concern, especially if occupied structures are constructed in the future. However, radon testing can easily determine if radon is an actual concern. Additionally, structural designs that incorporate radon mitigation systems can easily eliminate radon, should it be determined to be a concern.

11.3 Surrounding Properties – Actual Contamination

Evidence of actual historical contamination was not identified related to the surrounding properties.

11.4 Surrounding Properties – Potential Contamination

Evidence of potential contamination was identified related to the surrounding properties. This included the discovery of ASTs without apparent secondary containment located on the property immediately north and adjacent the Project Site, which slopes towards the Project Site. The following conclusions may change based upon new information or more extensive investigation into additional surrounding properties.

12.0 FINAL RECOMMENDATIONS

It is recommended that during the Project Site development phase, the contractors responsible for clearing and either removing the local topsoil, or cutting the subsoils to grade, be made aware of the potential for drilling wastes and/or organic soils that may produce methane gas. As indicated in the geotechnical reports, organic materials should be removed from the areas of future building construction.

Additionally, as previously mentioned in Section 8, based upon the unknown final disposition of drilling wastes associated with the former Marathon well drilled in LSD 7, care should be taken during excavation of topsoil and subsoils from within this area in case drilling or other wastes may have been buried upon the Project Site. If drilling wastes should be discovered, then an environmental consultant should be called to the site to sample the material and observe and properly document its disposal.

13.0 QUALIFICATIONS OF THE ASSESSORS

The Bifröst Assessor that completed the Project Site visit for this CSA Phase I ESA is Ms. Wendy Thorne. Ms. Thorne is a contracted assessor for Bifröst and has over 30 years of experience completing site assessments.

The Bifröst Assessor and Reviewer that wrote the report for this CSA Phase I ESA is Mr. Mark A. Lehar, P.Geo. Mr. Lehar is the General Manager of Bifröst and has over 30 years of experience completing site assessments.

A copy of the Assessors' resumes may be found in Appendix Y.

14.0 REFERENCES

Alberta Energy Regulator, August 14, 2024. “Area of Interest Summary.”

Alberta Energy Regulator, 24 November, 2023. “Marathon Cdn Sup Olds 100/7-3-33-1W5/00 Tour Report”.

Alberta Energy Regulator, August 14, 2024. “One Stop”. Extmapviewer.aer.ca/Onestop/Public/index.html

Alberta Environment and Protected Areas, 2023. Aerial Photograph, 49-1. 1:40,000. 17/ AS-0159. Edmonton, Alberta. 1949.

Alberta Environment and Protected Areas, 2023. Aerial Photograph, 82-O-16. 1:31,680. 109/ AS-871. Edmonton, Alberta. 1963.

Alberta Environment and Protected Areas, 2023. Aerial Photograph, 1:24,000. 68/ AS-1036 Line 1. Edmonton, Alberta. 1969.

Alberta Environment and Protected Areas, 2023. Aerial Photograph, 82-O-15. 75-219 Line 1. 1:24,000. 183/ AS-1556. Edmonton, Alberta. 1975.

Alberta Environment and Protected Areas, 2023. Aerial Photograph, 1:30,000. 62/ AS-2205. Edmonton, Alberta. 1980.

Alberta Environment and Protected Areas, 2023. Aerial Photograph, 1:25,000. 178/ AS-3164. Edmonton, Alberta. 1985.

Alberta Environment and Protected Areas, 2023. Aerial Photograph, T91-10 Line 7s. 1:20,000. 167/ AS-4133. Edmonton, Alberta. 1991.

Alberta Environment and Protected Areas, 2023. Aerial Photograph, 99-096 Line 9. 1:30,000. 136/ AS-4950. Edmonton, Alberta. 1998.

Alberta Environment and Protected Areas, 2023. Aerial Photograph, T91-10 Line 7s. 1:40,000. 195/ TRS-G0508-7. Edmonton, Alberta. 2005.

Alberta Environment and Protected Areas, 2023. Aerial Photograph, 09-296 Line 4E. 1:10,000. 217/ AS-5466. Edmonton, Alberta. 2009.

Alberta Environment and Protected Areas, 2023. Aerial Photograph, 1:15,000. 050/ DS-2015-226. Edmonton, Alberta. 2015.

Alberta Environment and Protected Areas, 2023. Approvals and Regulatory Requirements Viewer. SE 03-033-01-W5. Mountain View County, Alberta. 2 Documents. https://avw.alberta.ca/ApprovalViewer.aspx

Alberta Environment and Protected Areas, 2023 Environmental Site Assessment Repository. SE3-33-1-5. Mountain View County, Alberta. 2 Documents. https://www.alberta.ca/environmental-site-assessment-repository.aspx

Alberta Environment and Protected Areas, 2022. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division. 189 pp.

Alberta Environment and Protected Areas, 2022. Alberta Tier 2 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division. 129 pp.

Alberta Floods, 2023. Alberta Flood Awareness Map Application. Mountain View County, Alberta. https://floods.alberta.ca/

Alberta Land Titles Office, 2023. SE 03-033-01-W5. Mountain View County, Alberta. 1988 through the present.

Canadian Centre for Occupational Health and Safety, 2017. Indoor Air Quality – Moulds and Fungi. https://www.ccohs.ca/oshanswers/biol_hazards/iaq_mold.html

Canadian Standards Association, 2022. CAN/CSA Z768-01, Phase I Environmental Site Assessment. Toronto, Ontario, Canada. 44 pp.

Environmental Risk Information Service, 2023. 23111700859. Database Report. 1273927 Alberta Ltd. SE-3-33-1W5M – Olds, Alberta. 43 pp.

Environmental Risk Information Service, 2023. 23111700859p. Physical Setting Report. 1273927 Alberta Ltd. SE-3-33-1W5M – Olds, Alberta. 55 pp.

Flood Map.net, 2023. Olds, Alberta. Canada Flood Map. https://www.floodmap.net/

Google Earth, 2023. Aerial Image, SE 03-033-01-W5. Olds, Alberta. 2011.

Google Earth, 2023. Aerial Image, SE 03-033-01-W5. Olds, Alberta. 2018.

Google Earth, 2023. Aerial Image, SE 03-033-01-W5. Olds, Alberta. 2021.

Google Earth, 2023. Aerial Image, SE 03-033-01-W5. Olds, Alberta. 2023.

Google Maps, 2023. https://www.google.com/maps/place/Olds,+AB,+Canada/@51.8003457,-114.0574402,1305m/data=!3m1!1e3!4m6!3m5!1s0x53741058940a7299:0xa309df7b8a2cd122!8m2!3d51.7950595!4d-114.1199064!16zL20vMDY1eHZq?entry=ttu. 2023

Government of Alberta, 2019. National Fire Code – 2019 Alberta Edition. National Research Council of Canada. https://nrc-publications.canada.ca/eng/view/ft/?id=b9544ccc-3f65-4c8d-84e5-fe9bb20da1a2

Government of Alberta, 2020. Storage Tank System Management Regulation. AR 50/2010. Office of Consolidation. Alberta Queen's Printer.

Government of Alberta, 2020. Freedom of Information and Protection of Privacy Act. Revised Statutes of Alberta 2000. Chapter F-25. Office Consolidation. Alberta Queen's Printer.

Government of Alberta, 2021. Water Act. Revised Statutes of Alberta 2000. Chapter W-3. Office Consolidation. Alberta Queen's Printer.

Government of Alberta, 2021. Environmental Protection and Enhancement Act. Revised Statutes of Alberta 2000. Chapter E-12. Office Consolidation. Alberta Queen's Printer.

Government of Alberta, 2021. Safety Codes Act. Fire Code Regulation. AR 32/2015, as Amended by 21/2019. Office Consolidation. Alberta Queen's Printer.

Government of Alberta, 2023. Historical Environmental Enforcement Search. SE 03-033-01-W5. Olds, Alberta. https://www.alberta.ca/lookup/environmental-historical-enforcement-search.aspx

Government of Canada, 2015. PCB Regulations, SOR/2008-273. Justice Laws Website. http://laws-lois.justice.gc.ca/eng/regulations/SOR-2008-273/page-1.html

Government of Canada, 2016. Asbestos Products Regulations, SOR/2016-164. Justice Laws Website. http://laws-lois.justice.gc.ca/eng/regulations/SOR-2016-164/page-1.html

Government of Canada, 2017. Environment. Montreal Protocol. https://www.canada.ca/en/environment-climate-change/services/air-pollution/issues/ozone-layer/measures-protect/vienna-convention-montreal-protocol.html

Government of Canada, 2017. Environment. Ozone Depleting Substances. https://www.canada.ca/en/environment-climate-change/services/air-pollution/issues/ozone-layer/depletion-impacts/substances.html

Government of Canada, 2017. Health Canada. Lead-Based Paint. https://www.canada.ca/en/health-canada/services/home-safety/lead-based-paint.html

Government of Canada, 2017. Health Canada. Urea Foam Formaldehyde Insulation. https://www.canada.ca/en/health-canada/services/consumer-product-safety/advisories-warnings-recalls/letters-notices-information-industry/canadian-prohibition-urea-formaldehyde-foam-insulation.html

Halliburton, 4 January, 2011. "Material Safety Data Sheet: Q-Broxin". https://www.msdsdigital.com/system/files/Q-BROXIN%C2%AE.pdf

Interview, 2023. Mr. Greg Brown, B&A Planning Group. 4 December 2023.

Interview, 2023. Ms. Alanna Felske, Arletta Water Resources. 11 January 2024.

Interview, 2023. Mr. Matt MacDonald, the Pro Shop Manager, Olds Golf Club. 21 November 2023.

Interview, 2023. Mr. Joel Rombough, Watt Consulting Group. 11 January 2024.

McIntosh Lalani Engineering Ltd., April 2008. "Geotechnical Evaluation, Mountain View Meadows Business Park and Residential Community, Mountain View County – Alberta".

Mountain View County, Alberta, 2023. Environmentally Significant Areas (ESA's). https://mvcounty.maps.arcgis.com/apps/webappviewer/index.html?id=3c2a0441672c4226afae71888bcee5b5

Mountain View County, Alberta, 2023. Land Use Bylaw No. 21/21. Consolidated 21 June 2023. https://www.mountainviewcounty.com/Home/DownloadDocument?docId=eecce2a7-1114-4833-b67c-b6ddfa758d5d. 287pp.

Mountain View County, Alberta, 2023. Land Use Bylaw No. 21/21. Consolidated 21 June 2023. Map 6. https://www.mountainviewcounty.com/Home/DownloadDocument?docId=371cdccd-320b-4770-b982-8c8f89abea73. Page 6.

Olds, Alberta, 2023. Area Structure Plan. https://www.mountainviewcounty.com/Home/DownloadDocument?docId=fde1ebb6-e86a-4cc3-baaa-977c99035974. 2023

Olds, Alberta, 2023. Intermunicipal Development Plan. https://mountainviewcounty.com/Home/DownloadDocument?docId=1abec525-82b3-4616-b52d-ac6c60822a33

Olds, Alberta, 2023. Rural Address Web Map. https://mvcounty.maps.arcgis.com/apps/webappviewer/index.html?id=219c2c2d6df14bee8c1605efc0886e61

Radon Environmental Management Corp., 2011. Radon Potential Map of Canada.

15.0 CLOSURE

The findings and conclusions made with respect to actual or potential contamination, identified on the Project Site or surrounding properties, are solely based upon information collected and observations made during the generation of this assessment by Bifröst Environmental and Remediation Services Inc. for the Client, 1273927 Alberta Ltd. Any use or reliance of this report by any party other than: the Client, 1273927 Alberta Ltd., Mr. Greg Brown, Mr. John Froese, Mountain View County, and any of the previously referenced entities' shareholders, directors, officers, employees, contractors, agents, subcontractors, insurers, advisors, or authorized representatives, is the sole responsibility of that party.

Bifröst Environmental and Remediation Services Inc. does not guarantee, or make any representations with respect to this report to any party other than: the Client, 1273927 Alberta Ltd., Mr. Greg Brown, Mr. John Froese, and Mountain View County, as well as any of the previously referenced entities' shareholders, directors, officers, employees, contractors, agents, subcontractors, insurers, advisors, or authorized representatives. Should a party other than: the Client, 1273927 Alberta Ltd., Mr. Greg Brown, Mr. John Froese, and Mountain View County, as well as any of the previously referenced entities' shareholders, directors, officers, employees, contractors, agents, subcontractors, insurers, advisors, or authorized representatives, use the contents of this report, in whole or in part, to base decisions upon, rely upon, or take action based upon the conclusions of this report, then Bifröst Environmental and Remediation Services Inc. takes no responsibility or liability whatsoever, for any damages, losses, or harm that may be incurred by said party as a result.

CSA Phase 1 ESAs are solely a paper chase; therefore, no samples were collected and chemical testing was not completed on any media. The CSA Phase 1 ESA does not constitute a Hazardous Materials Assessment and no special attention items (e.g. asbestos, mold, lead-based paint, etc.) were sampled.

The assessment completed by Bifröst Environmental and Remediation Services Inc. is indicative of the Project Site conditions at the time and date of the Project Site visit, interviews completed, and historical information obtained during the records review at the time of the report. This report is only indicative of the Project Site conditions upon the date that it was generated. The findings of this report cannot be projected into the future to determine the potential for Project Site conditions with respect to actual or potential contamination at a future date. Conditions may change at the Project Site or additional information may become available that would change the conclusions of this report. Any such projection is at the sole risk of the user and nothing contained within this report is intended to constitute a legal opinion.

The contents of this report have been submitted in confidence and represent trade secrets and/or privileged, confidential, or financial information that has been prepared solely for the exclusive use of the Client, 1273927 Alberta Ltd., Mr. Greg Brown, Mr. John Froese, and Mountain View County, as well as any of the previously referenced entities' shareholders, directors, officers, employees, contractors, agents, subcontractors, insurers, advisors, or authorized representatives, and shall not be disclosed to third parties. The use of this report is subject to the terms and conditions stated within the Bifröst Environmental and Remediation Services Inc. service agreement entered into with the Client, 1273927 Alberta Ltd. Other than by Client, 1273927 Alberta Ltd., Mr. Greg Brown, Mr. John Froese, and Mountain View County, as well as any of the previously referenced entities' shareholders, directors, officers, employees, contractors, agents, subcontractors, insurers, advisors, or authorized representatives, this report may not be copied in whole, or in part, without the written consent of Bifröst Environmental and Remediation Services Inc.

PROFESSIONAL GEOSCIENTIST ALBERTA
MARK A. LEHAR
4 SEPT 2024

Mark A. Lehar, P.Geo.
Assessor/Validator
Bifröst Environmental and Remediation Services Inc.

Association of Professional Engineers and Geoscientists of Alberta
Permit to Practice #P13568
Validated by: Mark A. Lehar
Date: 4 September 2024

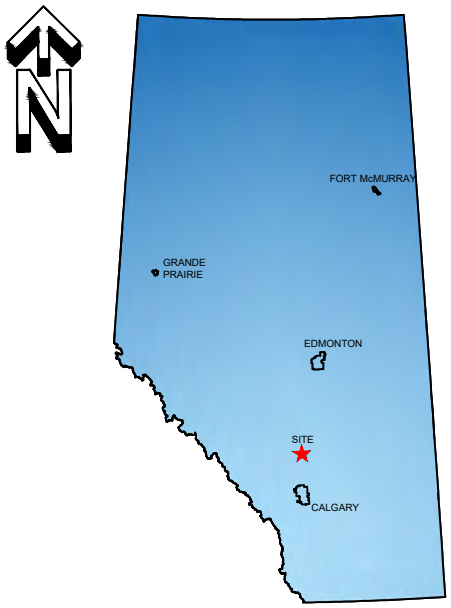
FIGURES



Bifröst

Environmental and Remediation Services Inc.

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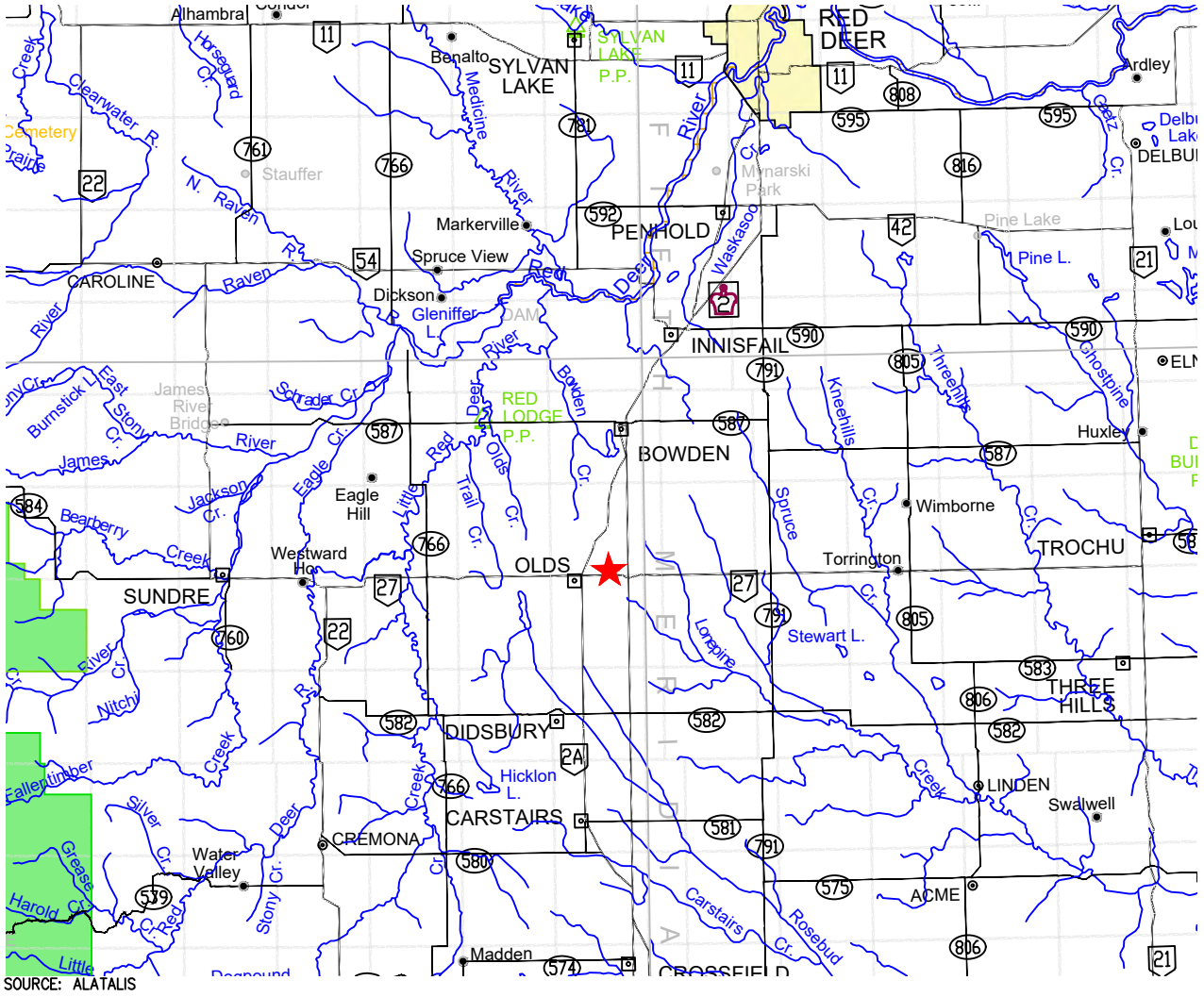
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- Highway - Primary
- Highway - Secondary
- Road
- Water
- City
- Hamlet
- Town
- Village
- Metis & Native Reserves
- Military Area
- Parks
- Site Location

W5M | W4M

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Twp. 30



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SITE LOCATION MAP

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: 1

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LEGEND

- SITE
- 100/07-03 WELL CENTRE
- PROPERTY LINE
- AGRICULTURAL LAND USE (A)
- COUNTRY RESIDENTIAL (R-CR)
- PARKS AND RECREATION (P-PR)
- BUSINESS PARK (BP)

PROPERTIES OF POTENTIAL CONCERN

1. PROJECT SITE
   NEUFELD, A, ET. AL (3), SE-03-033-01 W5M
- 1A PROJECT SITE BLOCK A
- 1B PROJECT SITE FORMER MARATHON WELL
- 1C PROJECT SITE SUSPECTED LEASE
2. OLDS CENTRAL HIGHLANDS GOLF CLUB
   33042 - RANGE ROAD 12
3. RURAL FARMSTEAD
   10-33039 RANGE ROAD 12
4. AGRICULTURE PROPERTY
   NEUFELD, A, ET. AT (3), NW-02-033-01 W5M
5. AGRICULTURE PROPERTY
   1223452 ALBERTA LTD.
   PLAN 0611833 BLOCK 2 LOT 2
   SW-02-033-01 W5M
6. AGRICULTURE PROPERTY AND FUTURE BUSINESS PARK
   VAN DEN BOSCH, J&K
   NW-35-032-01 W5M
7. RURAL FARMSTEAD
   1205 - HWY 27
8. AGRICULTURE PROPERTY
   RICHARDSON BROS (OLDS) LIMITED
   NE-34-032-01 W5M
9. AGRICULTURE PROPERTY
   VAN DEN BOSCH, J&K
   NW-34-032-01 W5M
10. AGRICULTURE PROPERTY
    HANSON S. AND CRACKNELL, L.
    SW-03-033-01 W5M
11. AGRICULTURE PROPERTY
    ALBERTA FORAGE FARMING INC
    SW-10-033-01 W5M

NOTES:

LOCATIONS ARE APPROXIMATE.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

AERIAL IMAGE SOURCE: MICROSOFT (BING)

0 100 200 400m

Scale 1 : 10 000

DRAWING SHOULD BE PRINTED ON 11x17 (TABLOID) PAPER FOR ACCURATE SCALING.

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SITE AND SURROUNDING PROPERTIES

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: 2

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LEGEND

SITE

NOTES:

LOCATIONS ARE APPROXIMATE.

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SITE DIAGRAM

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: 3

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N

LEGEND

- SITE
- 100/07-03 WELL CENTRE
- PROPERTY LINE
- LEASE BOUNDARY AND ACCESS ROAD FROM 1978 SURVEY (REC. CERT.)
- ACCESS R/W FROM 1978 SURVEY (ABADATA)
- SUSPECTED LEASE AND ACCESS ROAD VISIBLE IN HISTORIC AERIAL PHOTOS
- WATER-FILLED DITCH
- WATER PIPE

NOTES:

LOCATIONS ARE APPROXIMATE.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

AERIAL IMAGE SOURCE: MICROSOFT (BING)

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SITE DETAIL

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: 4

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LEGEND

- SITE
- 100/07-03 WELL CENTRE
- PROPERTY LINE
- IDENTIFIED PROPERTIES OF POTENTIAL CONCERN

PROPERTIES OF POTENTIAL CONCERN

1. PROJECT SITE
   NEUFELD, A, ET. AL (3), SE-03-033-01 W5M
- 1A PROJECT SITE BLOCK A
- 1B PROJECT SITE FORMER MARATHON WELL
- 1C PROJECT SITE SUSPECTED LEASE
2. OLDS CENTRAL HIGHLANDS GOLF CLUB
   33042 - RANGE ROAD 12
3. RURAL FARMSTEAD
   10-33039 RANGE ROAD 12
4. AGRICULTURE PROPERTY
   NEUFELD, A, ET. AT (3), NW-02-033-01 W5M
5. AGRICULTURE PROPERTY
   1223452 ALBERTA LTD.
   PLAN 0611833 BLOCK 2 LOT 2
   SW-02-033-01 W5M
6. AGRICULTURE PROPERTY AND FUTURE BUSINESS PARK
   VAN DEN BOSCH, J&K
   NW-35-032-01 W5M
7. RURAL FARMSTEAD
   1205 - HWY 27
8. AGRICULTURE PROPERTY
   RICHARDSON BROS (OLDS) LIMITED
   NE-34-032-01 W5M
9. AGRICULTURE PROPERTY
   VAN DEN BOSCH, J&K
   NW-34-032-01 W5M
10. AGRICULTURE PROPERTY
    HANSON S. AND CRACKNELL, L.
    SW-03-033-01 W5M
11. AGRICULTURE PROPERTY
    ALBERTA FORAGE FARMING INC
    SW-10-033-01 W5M

NOTES:

LOCATIONS ARE APPROXIMATE.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

AERIAL IMAGE SOURCE: MICROSOFT (BING)

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Scale 1 : 10 000

DRAWING SHOULD BE PRINTED ON 11x17 (TABLOID) PAPER FOR ACCURATE SCALING.

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PROPERTIES OF POTENTIAL CONCERN

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: 5

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LEGEND

- SITE
- OUTLINE OF EM31 SURVEY
- 100/07-03 WELL CENTRE
- PROPERTY LINE
- LEASE BOUNDARY AND ACCESS ROAD FROM 1978 SURVEY (REC. CERT.)
- ACCESS R/W FROM 1978 SURVEY (ABADATA)
- SUSPECTED LEASE AND ACCESS ROAD VISIBLE IN HISTORIC AERIAL PHOTOS
- WATER-FILLED DITCH
- WATER PIPE

NOTES:

LOCATIONS ARE APPROXIMATE.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

AERIAL IMAGE SOURCE: MICROSOFT (BING)

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Scale 1 : 5000

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LOCATION OF EM SURVEYS

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: 6

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LEGEND

- SITE
- OUTLINE OF METHANE SURVEY
- 100/07-03 WELL CENTRE
- BACKGROUND SAMPLE
- PROPERTY LINE
- LEASE BOUNDARY AND ACCESS ROAD FROM 1978 SURVEY (REC. CERT.)
- ACCESS R/W FROM 1978 SURVEY (ABADATA)
- SUSPECTED LEASE AND ACCESS ROAD VISIBLE IN HISTORIC AERIAL PHOTOS
- WATER-FILLED DITCH
- WATER PIPE

NOTES:

LOCATIONS ARE APPROXIMATE.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

AERIAL IMAGE SOURCE: MICROSOFT (BING)

0 50 100 200m

Scale 1 : 5000

DRAWING SHOULD BE PRINTED ON 11x17 (TABLOID) PAPER FOR ACCURATE SCALING.

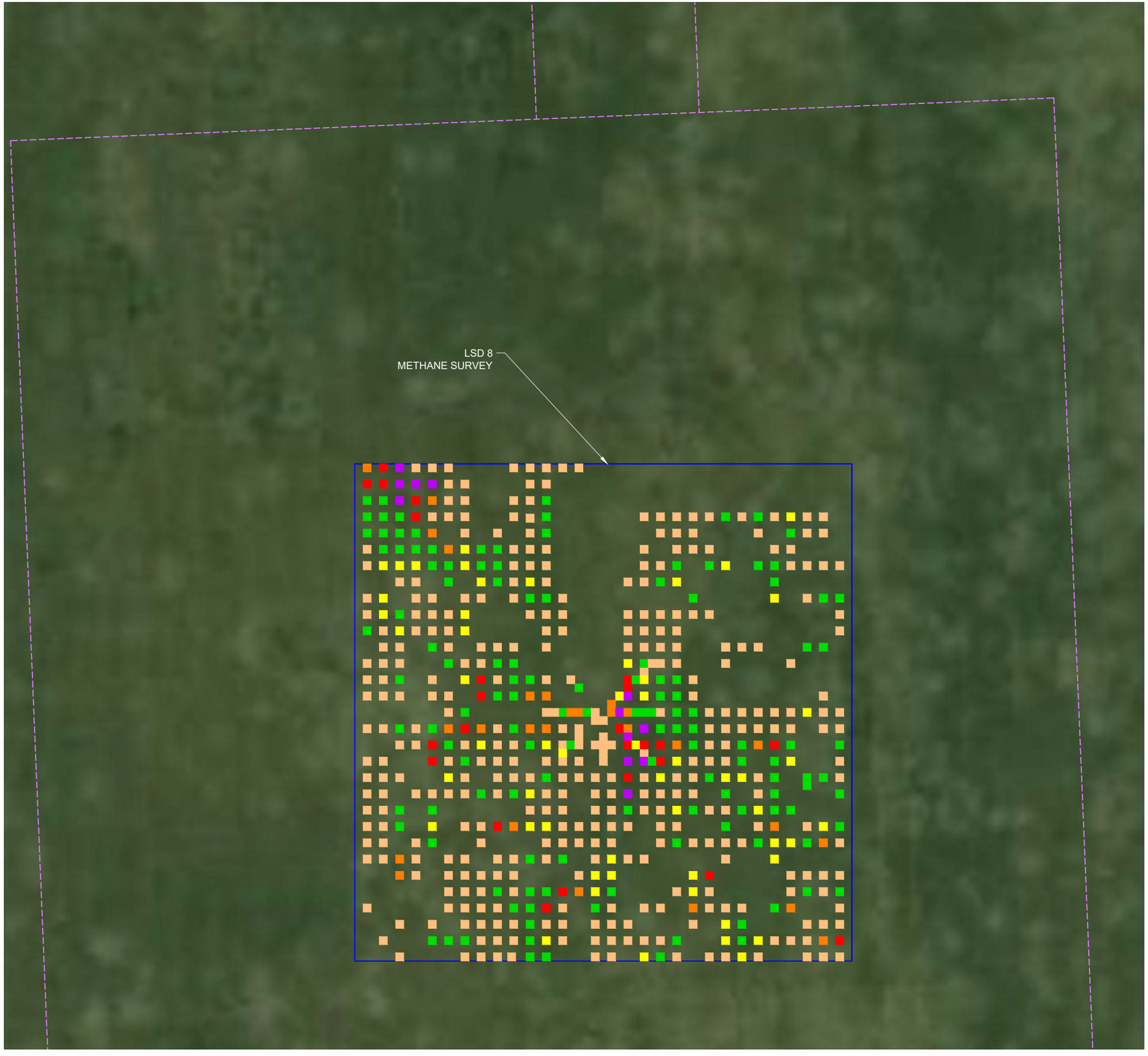
Bifröst Environmental and Remediation Services Inc.	Date: 04-SEPTEMBER-2024	Drawn by: LH	Revised by: RJ
	File name: 2023064_24PH1_B.dwg	Requested by: ML	Approved by: ML

LOCATION OF METHANE SURVEYS

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: 7

File: 2024064_24PH1.dwg Date: Wednesday, September 4, 2024 1:05:26 PM



LEGEND

- SITE
- OUTLINE OF METHANE SURVEY
- PROPERTY LINE
- SUSPECTED LEASE AND ACCESS ROAD VISIBLE IN HISTORIC AERIAL PHOTOS
- DETECTION OF 2-10 PPM
- DETECTION OF11-19 PPM
- DETECTION OF 20-29 PPM
- DETECTION OF 30-39 PPM
- DETECTION OF 40-69 PPM
- DETECTION OF 70 PPM OR GREATER

NOTES:

LOCATIONS ARE APPROXIMATE.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

AERIAL IMAGE SOURCE: MICROSOFT (BING)

0 5 10 20m

Scale 1 : 500

DRAWING SHOULD BE PRINTED ON 11x17 (TABLOID) PAPER FOR ACCURATE SCALING.

Bifröst Environmental and Remediation Services Inc.	Date: 04-SEPTEMBER-2024	Drawn by: RJ	Revised by: --
	File name: 2023064_24PH1_B.dwg	Requested by: ML	Approved by: ML

RESULTS OF METHANE SURVEY ON LSD 8

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: 8

File: 2024064_24PH1.dwg Date: Wednesday, September 4, 2024 1:05:54 PM



N

LEGEND

- SITE
- OUTLINE OF EM31 SURVEY
- 100/07-03 WELL CENTRE
- PROPERTY LINE
- CONCEPTUAL LOT LINES
- LEASE BOUNDARY AND ACCESS ROAD FROM 1978 SURVEY (REC. CERT.)
- ACCESS R/W FROM 1978 SURVEY (ABADATA)
- SUSPECTED LEASE AND ACCESS ROAD VISIBLE IN HISTORIC AERIAL PHOTOS
- WATER-FILLED DITCH
- WATER PIPE

NOTES:

LOCATIONS ARE APPROXIMATE.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

AERIAL IMAGE SOURCE: MICROSOFT (BING)

CONCEPTUAL DESIGN PROVIDED BY NETOOK NORTH - (2023-322 Concept SE3 2024July30.dwg)

0 50 100 200m

Scale 1 : 5000

DRAWING SHOULD BE PRINTED ON 11x17 (TABLOID) PAPER FOR ACCURATE SCALING.

Bifröst Environmental and Remediation Services Inc.	Date: 04-SEPTEMBER-2024	Drawn by: RJ	Revised by: --
	File name: 2023064_24PH1_B.dwg	Requested by: ML	Approved by: ML

ENVIRONMENTAL SUMMATION ON CONCEPT PLAN

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: 9

APPENDICES

Bifröst

Environmental and Remediation Services Inc.

APPENDIX A

Aerial Photographs

Bifröst

Environmental and Remediation Services Inc.

File: 2023061_24PH1.dwg Date: Monday, January 22, 2024 1:37:29 PM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: AEAP.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
22-JAN-2024	LH	LH
File name:	Requested by:	Approved by:
2023061_24PH1_A.dwg	ML	ML

1949 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure:

A1

File: 2023061_24PH1.dwg Date: Monday, January 22, 2024 11:37:29 PM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: AEAP.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
22-JAN-2024	LH	LH
File name: 2023061_24PH1_B.dwg	Requested by: ML	Approved by: ML

1963 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure:

A2

File: 2023061_24PH1.dwg Date: Monday, January 22, 2024 1:37:29 PM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: AEAP.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
22-JAN-2024	LH	LH
File name:	Requested by:	Approved by:
2023061_24PH1_B.dwg	ML	ML

1969 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure:

A3

File: 2023061_24PH1.dwg Date: Monday, January 22, 2024 1:37:29 PM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: AEAP.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
22-JAN-2024	LH	LH
File name: 2023061_24PH1_B.dwg	Requested by: ML	Approved by: ML

1975 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: A4

File: 2023061_24PH1.dwg Date: Monday, January 22, 2024 1:37:29 PM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: AEAP.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
22-JAN-2024	LH	LH
File name: 2023061_24PH1_B.dwg	Requested by: ML	Approved by: ML

1980 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: A5

File: 2023061_24PH1.dwg Date: Monday, January 22, 2024 12:57:10 PM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: AEAP.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
22-JAN-2024	LH	LH
File name:	Requested by:	Approved by:
2023061_24PH1_B.dwg	ML	ML

1985 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure:

A6

File: 2023061_24PH1.dwg Date: Monday, January 22, 2024 1:37:29 PM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: AEAP.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
22-JAN-2024	LH	LH
File name:	Requested by:	Approved by:
2023061_24PH1_B.dwg	ML	ML

1991 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure:

A7

File: 2023061_24PH1.dwg Date: Monday, January 22, 2024 12:57:10 PM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: AEAP.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
22-JAN-2024	LH	LH
File name:	Requested by:	Approved by:
2023061_24PH1_B.dwg	ML	ML

1998 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure:

A8

File: 2023061_24PH1.dwg Date: Tuesday, July 23, 2024 11:44:46 AM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: AEAP.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
23-JULY-2024	LH	RJ/LH
File name:	Requested by:	Approved by:
2023061_24PH1_C.dwg	ML	ML

2005 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure:

A9

File: 2023061_24PH1.dwg Date: Tuesday, July 23, 2024 11:44:46 AM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: AEAP.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
23-JULY-2024	LH	RJ/LH
File name:	Requested by:	Approved by:
2023061_24PH1_C.dwg	ML	ML

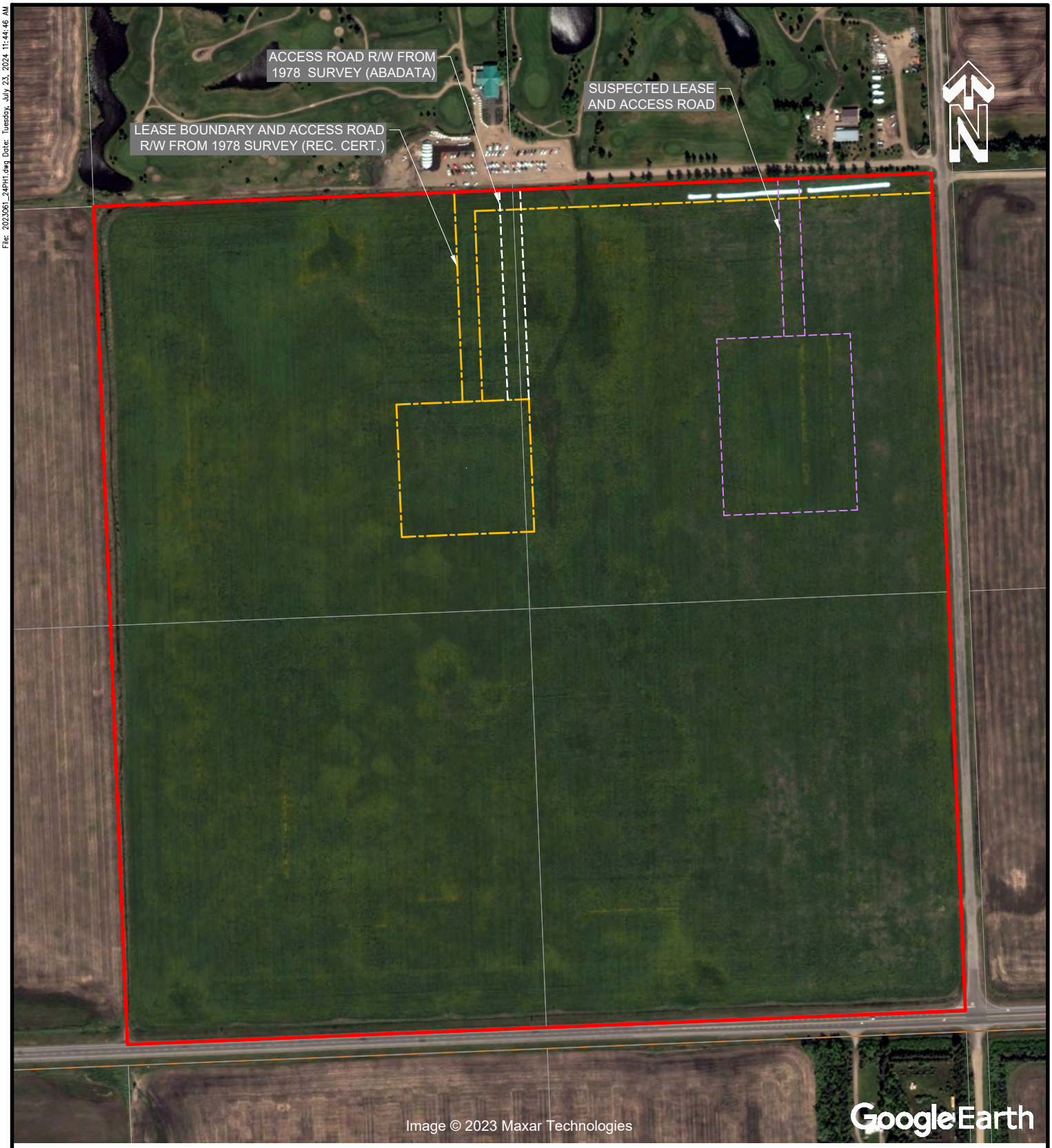
2009 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure:

A10

File: 2023061_24PH1.dwg Date: Tuesday, July 23, 2024 11:44:46 AM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: GOOGLE EARTH.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

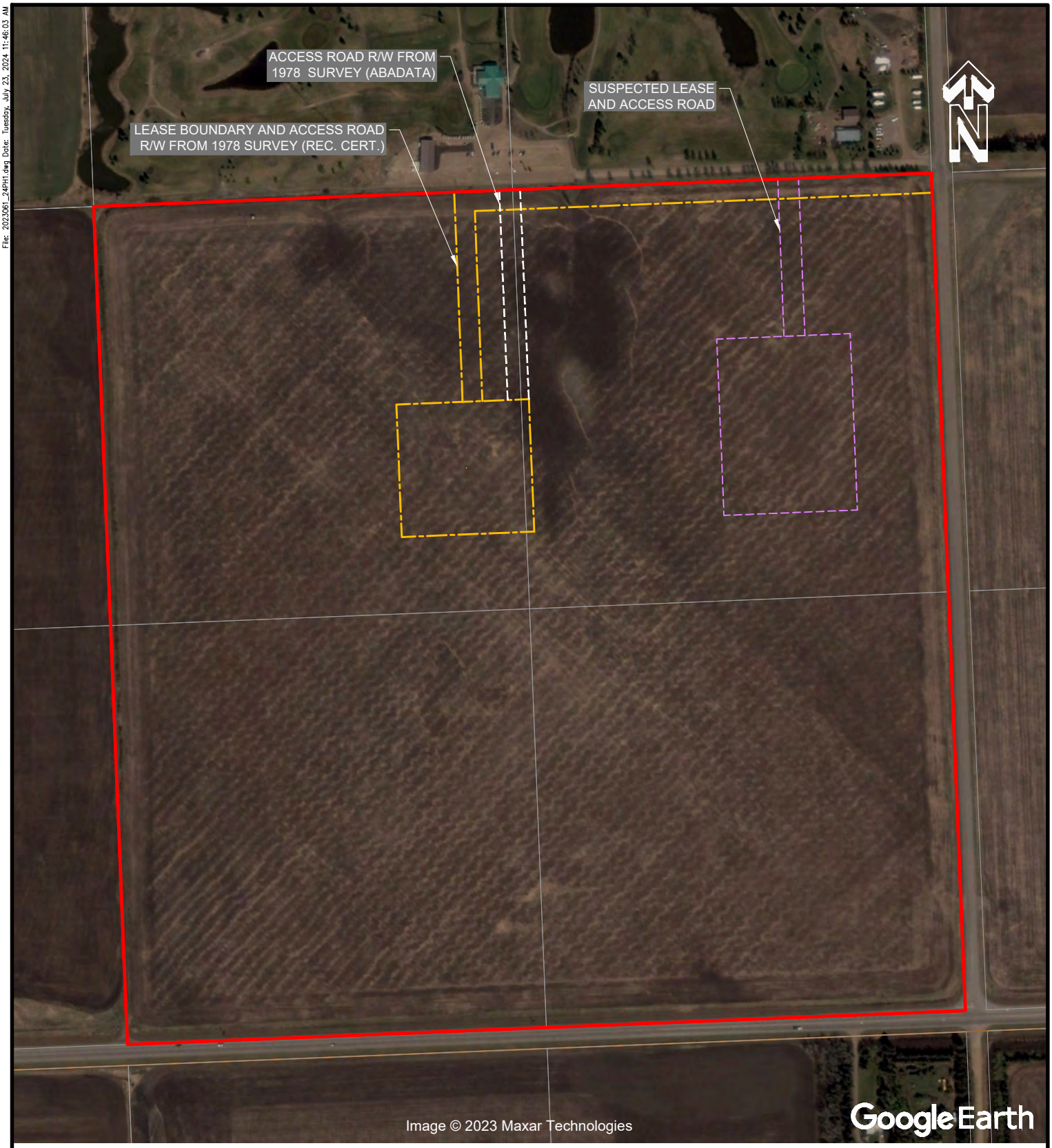
Date:	Drawn by:	Revised by:
23-JULY-2024	LH	RJ/LH
File name: 2023061_24PH1_C.dwg	Requested by: ML	Approved by: ML

2011 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: A11

File: 2023061_24PH1.dwg Date: Tuesday, July 23, 2024 11:46:03 AM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: GOOGLE EARTH.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

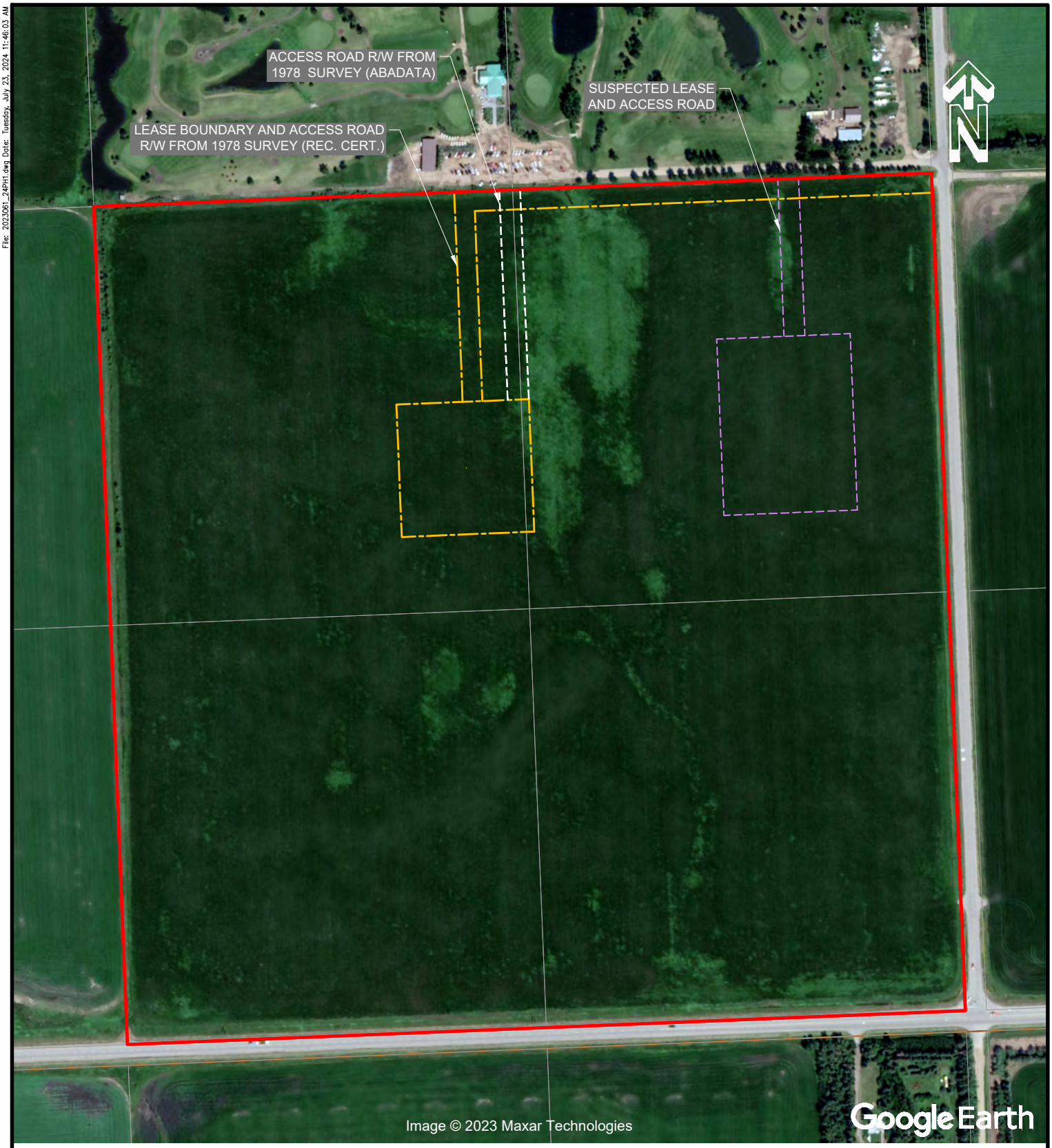
Date:	Drawn by:	Revised by:
23-JULY-2024	LH	RJ/LH
File name: 2023061_24PH1_C.dwg	Requested by: ML	Approved by: ML

2015 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: A12

File: 2023061_24PH1.dwg Date: Tuesday, July 23, 2024 11:46:03 AM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: GOOGLE EARTH.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
23-JULY-2024	LH	RJ/LH
File name:	Requested by:	Approved by:
2023061_24PH1_C.dwg	ML	ML

2018 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure:

A13

File: 2023061_24PH1.dwg Date: Tuesday, July 23, 2024 11:46:03 AM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: GOOGLE EARTH.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst Environmental and Remediation Services Inc.	Date: 23-JULY-2024	Drawn by: LH	Revised by: RJ/LH
	File name: 2023061_24PH1_C.dwg	Requested by: ML	Approved by: ML

2021 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure: A14

File: 2023061_24PH1.dwg Date: Tuesday, July 23, 2024 11:46:03 AM



NOTES:

LOCATIONS ARE APPROXIMATE.

AERIAL PHOTO SOURCE: GOOGLE EARTH.

ACCESS ROAD R/Ws SHOWN DIFFERENTLY ON TWO SURVEYS, NO REVISION DATE SHOWN.

0 50 100 200m

Scale 1 : 5000

Bifröst
Environmental and Remediation Services Inc.

Date:	Drawn by:	Revised by:
23-JULY-2024	LH	RJ/LH
File name:	Requested by:	Approved by:
2023061_24PH1_C.dwg	ML	ML

2023 AERIAL PHOTO

1273927 ALBERTA LTD.
SE-03-033-01 W5M

Figure:

A15

APPENDIX B

Fire Insurance Plans

Bifröst
Environmental and Remediation Services Inc.

No Records

No records were recovered (the category is applicable but the records do not exist), the records were not available (the category is applicable but the records are not available), or the records category was not applicable to this particular Phase I ESA Site.

APPENDIX C

City Directories

Bifröst

Environmental and Remediation Services Inc.

No Records

No records were recovered (the category is applicable but the records do not exist), the records were not available (the category is applicable but the records are not available), or the records category was not applicable to this particular Phase I ESA Site.

APPENDIX D

ESAR Documents

Bifröst

Environmental and Remediation Services Inc.

APPENDIX D1

Marathon

Bifröst

Environmental and Remediation Services Inc.

Marathon
Petroleum Canada Ltd.

500-639 Fifth Avenue, S.W.
Calgary, Alberta, T2P OM9
Telephone 403/263-5020

June 20, 1979

Canada Permanent Trust Company,
315 - 8th Avenue S.W.,
Calgary, Alberta,
T2P 1C8

Attention: Miss I. Boshouwers

Mrs. Kathleen J. Alexander,
Post Office Box 699,
Olds, Alberta,
TOM 1PO

Dear Mesdames:

Subject: Notice of Surrender
East Olds 7-3-33-1-W5M
Our File: ASL-032 (55-Canada-4884)
Your Reference: Alexander Estate 312

Marathon Petroleum Canada Ltd., is required by the covenants in the Surface Lease, dated July 31, 1978, to give you the attached 30-days notice of surrender of the Surface Lease. Upon such notice, the lease then terminates at the next anniversary date, July 31, 1979, providing that a Reclamation Certificate has been issued by the Surface Reclamation Council. Having recently inspected the site personally and having been in contact on various occasions with the contractor who is restoring the site, I feel that we can restore the site satisfactorily within the allotted time and I will then be in contact with you with regards to a final release.

If you should have any questions in regards to this matter, I would be pleased to hear from you. I can be reached by phoning the Calgary office at 263-5020.

Yours very truly,

MARATHON PETROLEUM CANADA LTD.

Ross Walker

J. R. Walker,
Associate Landman.

cc: Surface Reclamation Council
Mr. Ralph McBeath

DEINES MICRO-FILM
SERVICES LTD.

This notice is given pursuant to Clauses 4 and 8 of the covenants contained in the said Surface Rights Lease.

We wish to thank you for the consideration shown by you to us during the time we held this lease.

Yours very truly,

MARATHON PETROLEUM CANADA LTD.

Ross Walker

J. R. Walker,
Associate Landman.

JRW/mcm

cc: Surface Reclamation Council ✓
Mr. Ralph McBeath

DEINES MICRO-FILM
SERVICES LTD.

Marathon
Petroleum Canada Ltd.

500-639 Fifth Avenue, S.W.
Calgary, Alberta, T2P OM9
Telephone 403/263-5020

DOUBLE REGISTERED

June 20, 1979

Canada Permanent Trust Company,
315 - 8th Avenue S.W.,
Calgary, Alberta,
T2P 1C8

Attention: Miss I. Boshouwers

Mrs. Kathleen J. Alexander,
Post Office Box 699,
Olds, Alberta,
TOM 1PO

Dear Mesdames:

Subject: Surrender of Surface Rights Lease
East Olds 7-3-33-1-W5M
SE¼ of Section 3-33-1-W5M
Our File: ASL-032 (55-Canada-4884)
Your Reference: Alexander Estate 312

Kindly be notified that effective July 30, A.D., 1979, Marathon Petroleum Canada Ltd., terminates the Surface Rights Lease dated July 31, 1978, between yourself as Lessor and it as Lessee of:

> The Southeast Quarter (SE¼) of Section Three (3) in Township Thirty-three (33), Range One (1), West of the Fifth (5th) Meridian in the Province of Alberta

and surrenders unto you, your heirs, executors, administrators and assigns the said lands and premises together with all rights acquired under the said lease.

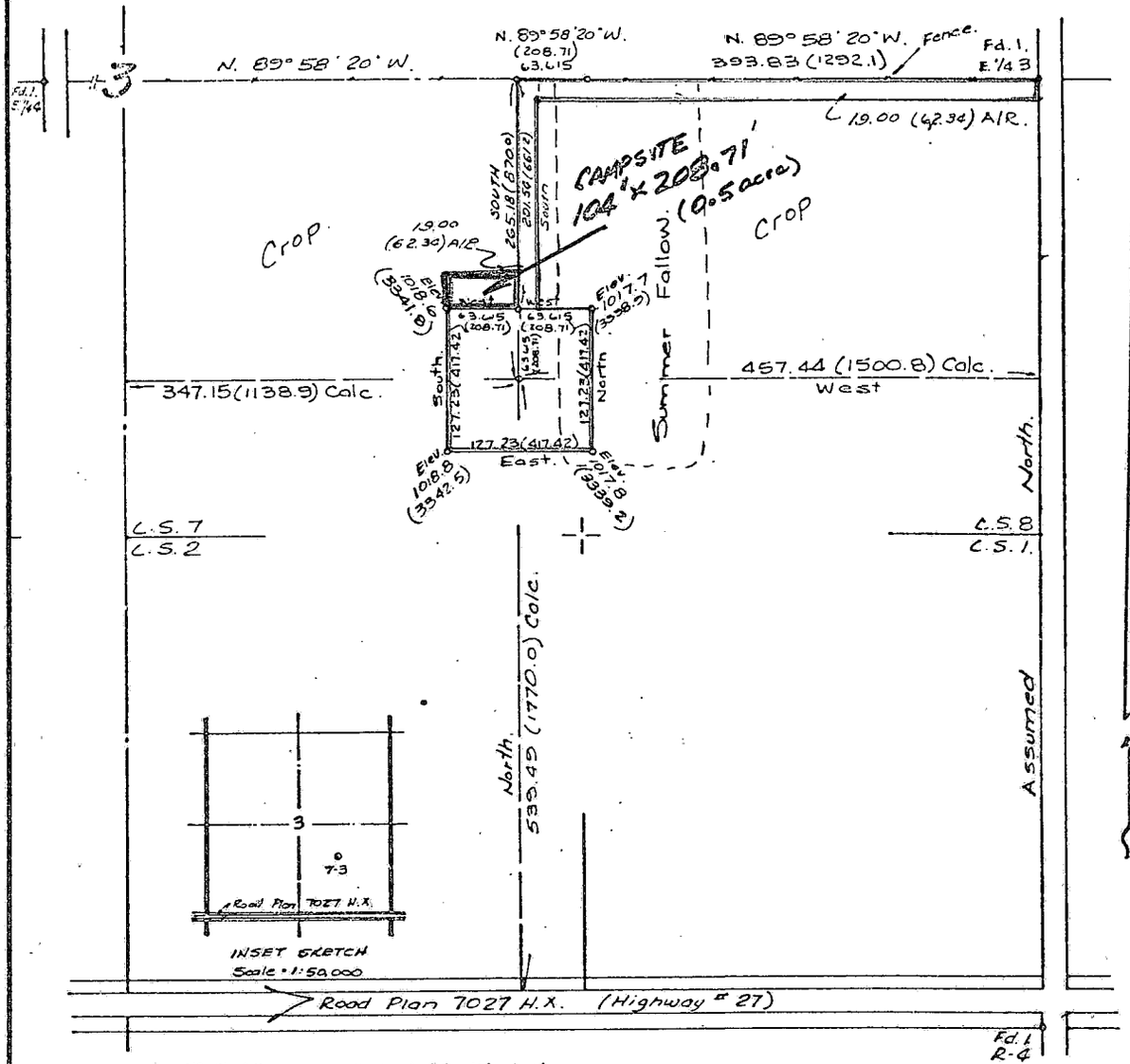
-- 2

DEINES MICRO-FILM
SERVICES LTD.

MPCL CDN - SUP OLDS 7-3-33-1

Well Site and Access Road

L.S. 7 Sec. 3 Tp. 33 Rge. 1 W. 5 M.



I certify that the survey represented by this plan is correct to the best of my knowledge and was completed on the 24th. day of July A.D., 1978.

Stephen Nagy-Gyarfas
Alberta Land Surveyor

Gary Sundeloe
Witness

MIDWEST SURVEYS & SERVICES LTD.

Access Road Revised: Oct. 17th, 1978.

ELEVATION: 1018.8 (3342.5) Ground

CO-ORDS: 539.49 North of South boundary } Sec. 3
457.44 West of East boundary }

AREAS:

Well Site	4.00	acres
Access Road	3.00	acres
Total	7.00	acres

MARATHON PETROLEUM CANADA LTD.

W. A. Mahoney

SCALE:
Survey monuments found shown thus: °
Survey monuments planted shown thus: °
Portions referred to outlined
Distances are in meters and decimals.
Distances in brackets are in feet and decimals.

DATUM: Top of Rail
E. Edy Sec. 16-33-1W5M
Elev. 1023.2

C-650-78-1

DEINES MICRO-FILM SERVICES LTD.

ASL-032
55-Canada-4884

RELEASE

KNOW ALL MEN by these presents that I, Ralph McBeath (occupant) of the Town of Olds in the Province of Alberta in consideration of the sum of ($) Dollars now paid to me by Marathon Petroleum Canada Ltd., a body corporate incorporated under the laws of Alberta, duly qualified to carry on business in the Province of Alberta and having an office at the City of Calgary, in the Province of Alberta (the receipt of which sum is hereby acknowledged), do hereby REMISE, RELEASE AND FOREVER DISCHARGE the said Marathon Petroleum Canada Ltd., its servants, agents, employees, contractors, successors and assigns, of and from all manner of actions, causes of action, suits, debts, claims and demands whatsoever, and without limiting the generality of the foregoing, in particular all manner of actions, causes of action, suits, debts, claims and demands arising out of or connected with: abandonment, clean-up and restoration of a wellsite and access road located in the Southeast Quarter (SE¼) of Section Three (3), in Township Thirty-three (33), Range One (1), West of the Fifth (5th) Meridian, in the Province of Alberta which against the said Marathon Petroleum Canada Ltd., its servants, agents, employees, contractors, successors and assigns, or any of them, ever had, now have or which I, my heirs, executors, administrators or assigns, or any person claiming by, through or under me, hereafter can, shall or may have for or by reason thereof or by reason of any act, matter of thing whatsoever existing up to the present time.

IN WITNESS WHEREOF I have hereunto set my hand and seal this 23 day of July A.D., 19 79

SIGNED, SEALED AND DELIVERED)
in the presence of:)
J. Ross Walker)

Ralph McBeath OCCUPANT

AFFIDAVIT OF EXECUTION

CANADA)
PROVINCE OF ALBERTA)
TO WIT:)

I, J. Ross Walker, of Calgary in the Province of Alberta Associate Landman MAKE OATH AND SAY:

1. THAT I was personally present and did see Ralph McBeath named in the within instrument, who is ~~xxxx~~personally known to me to be the person(s) named therein duly sign, seal and execute the same for the purposes named therein.
2. THAT the same was executed at Olds in the Province of Alberta and that I am the subscribing witness thereto.
3. THAT I know the said Ralph McBeath and he (~~xxxxxx~~) is (~~xxxxxxxxxxxxxxxx~~), in my belief, of the full age of Eighteen (18) years.

SWORN before me at Calgary)
in the Province of Alberta, this 25th)
day of July A.D. 1979)
Mary le Mayer)
A COMMISSIONER FOR OATHS IN AND FOR THE PROVINCE OF ALBERTA

J. Ross Walker

Alta/76

DEINES MICRO-FILM SERVICES LTD.

Date Searched July 27/79

Date Recorded July 27/79

Marathon
Petroleum Canada Ltd.

500-639 Fifth Avenue, S.W.
Calgary, Alberta, T2P OM9
Telephone 403/263-5020

July 24, 1979

Alberta Environment,
Surface Reclamation Council,
11th Floor Oxbridge Place,
9820 - 106th Street,
Edmonton, Alberta,
T5K 1C2

Attention: Mr. Stan Tracy

Dear Sir:

Subject: Request for Reclamation Certificate
MPCL CDN-SUP Olds 7-3-33-1-W5M
SE¼ Section 3-33-1-W5M
Our File: ASL-032 (55-Canada-4884)

Marathon has restored the site and access road to the captioned abandoned well. A plan of the wellsite and roadway is attached. We also attach copies of Release Agreements dated July 23, 1979 signed by the owner of the land and the occupant.

We respectfully request that a Reclamation Certificate be issued to cover the captioned wellsite and access roadway.

Yours very truly,

MARATHON PETROLEUM CANADA LTD.

Ross Walker

J. R. Walker,
Associate Landman.

JRW/mcm

Enc.

DEINES MICRO-FILM
SERVICES LTD.

RENEWAL
7767 I.K.

Certificate of Title

NO. 127678
REF. 109711 14
VALUE $ 11119500

Canada

GOVERNMENT OF THE PROVINCE OF ALBERTA

JC

	MRG	TWP	SEC	Q	PT
1	5	1	33	3	SE

	PLAN	BLK	LOT	PT
2				

South Alberta Land Registration District

THIS IS TO CERTIFY that KATHLEEN JOYCE HAIG ALEXANDER OF OLDS IN THE PROVINCE OF ALBERTA (WIDOW) AND CANADA PERMANENT TORONTO GENERAL TRUST COMPANY EXECUTORS OF THE WILL OF ROBERT MORRIS ALEXANDER (DECEASED)

ARE now the owner S of an estate in fee simple

of and in THE SOUTH EAST QUARTER OF SECTION THREE (3) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN CONTAINING ONE HUNDRED AND SIXTY (160) ACRES MORE OR LESS,

EXCEPTING THEREOUT THE CONNECTING HIGHWAY ON PLAN 7027 H.X. CONTAINING TWO AND NINETY SEVEN HUNDREDTHS (2.97) ACRES MORE OR LESS,

EXCEPTING THEREOUT ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME.

NOT A VALID TITLE
PHOTO COPY ONLY
9 AM JUL 27 1979
SOUTH ALBERTA LAND
REGISTRATION DISTRICT

Trust Co
315-8th Ave SW
Calgary, Alta
T2P 1C8

SUBJECT TO THE ENCUMBRANCES, LIENS, ESTATES OR INTERESTS NOTIFIED BY MEMORANDUM UNDERWRITTEN OR ENDORSED HEREON, OR WHICH MAY HEREAFTER BE MADE IN THE REGISTER.

IN WITNESS WHEREOF I have hereunto subscribed my name and affixed my official seal

this 27 day of JULY, A.D. 1962

Post Office Address KATHLEEN JOYCE HAIG ALEXANDER
OLDS, ALBERTA
CANADA PERMANENT TORONTO GENERAL TRUST COMPANY
CALGARY, ALBERTA

SOUTH ALBERTA LAND REGISTRATION DISTRICT

Registrar

A.G.1818 V.1232
Rev.9-73

South Alberta Land Registration District

DEINES MICRO-FILM
SERVICES LTD.

ABBREVIATIONS

E – Easement
C – Caveat
Tr – Transmission
Tfr – Transfer
Mtge – Mortgage
URW – Utility Right of Way
BL – Builders Lien
TN – Tax Notification
WE – Writ of Execution
C.C. – Covenants and Conditions
ENCUM – Encumbrance

Certificate of Title

Show Other Abbreviations Here

NAME KATHLEEN JOYCE HAIG ALEXANDER ET AL (EXEC)

LAND 5 1 33 3 SE

TITLE NO. 1 2 7 S 7 8

CHARGES, LIENS AND INTERESTS.

Nature of Instrument	Registration Number	Date of Registration DY	MO	YR	Amount	PARTICULARS	Signature of Registrar	Discharges and Withdrawals: Registration Number	Date of Registration DY	MO	YR	Signature of Registrar
C	781191401	27	11	78		MARATHON PETROLEUM CANADA LTD.						

DEINES MICRO-FILM SERVICES LTD.

ASL-032
55-Canada-4884

RELEASE

KNOW ALL MEN by these presents that I, Kathleen Joyce Haig Alexander and Canada Permanent Toronto General Trust Company of the town of Olds and the City of Calgary in the Province of Alberta Executors of the Estate of R. M. Alexander in consideration of the sum of FIFTY ($50.00) Dollars now paid to me by Marathon Petroleum Canada Ltd., a body corporate incorporated under the laws of Alberta, duly qualified to carry on business in the Province of Alberta and having an office at the City of Calgary, in the Province of Alberta (the receipt of which sum is hereby acknowledged), do hereby REMISE, RELEASE AND FOREVER DISCHARGE the said Marathon Petroleum Canada Ltd., its servants, agents, employees, contractors, successors and assigns, of and from all manner of actions, causes of action, suits, debts, claims and demands whatsoever, and without limiting the generality of the foregoing, in particular all manner of actions, causes of action, suits, debts, claims and demands arising out of or connected with:

the abandonment, cleanup and restoration of a wellsite and access roadway located in the Southeast Quarter (SE¼) of Section Three (3), in Township Thirty-three (33), Range One (1), West of the Fifth (5th) Meridian in the Province of Alberta

which against the said Marathon Petroleum Canada Ltd., its servants, agents, employees, contractors, successors and assigns, or any of them, ever had, now have or which I, my heirs, executors, administrators or assigns, or any person claiming by, through or under me, hereafter can, shall or may have for or by reason thereof or by reason of any act, matter of thing whatsoever existing up to the present time.

IN WITNESS WHEREOF I have hereunto set my hand and seal this 23 day of July A.D., 19 79

SIGNED, SEALED AND DELIVERED)
in the presence of:)
J. Ross Walker)

I hereby consent to the surrender of the Surface Lease dated July 31, 1978

Kathleen Joyce Haig Alexander, Executor

Canada Permanent Toronto General Trust Company - Executor

AFFIDAVIT OF EXECUTION

CANADA)
PROVINCE OF ALBERTA)
)
TO WIT:)

I, J. Ross Walker, of Calgary in the Province of Alberta Associate Landman MAKE OATH AND SAY:

1. THAT I was personally present and did see Kathleen Joyce Haig Alexander, Executor named in the within instrument, who is (~~are~~) personally known to me to be the person(s) named therein duly sign, seal and execute the same for the purposes named therein.
2. THAT the same was executed at Olds in the Province of Alberta and that I am the subscribing witness thereto.
3. THAT I know the said Kathleen Joyce Haig Alexander, Executor and ~~they~~ she) is (~~are~~), in my belief, of the full age of Eighteen (18) years.

SWORN before me at Calgary)
in the Province of Alberta, this 25th)
day of July A.D. 1979)
)
Mary E Meyer)
A COMMISSIONER FOR OATHS IN AND FOR THE PROVINCE OF ALBERTA

J. Ross Walker

Alta/76

DEINES MICRO-FILM SERVICES LTD.

Marathon
Petroleum Canada Ltd.

500-639 Fifth Avenue, S.W.
Calgary, Alberta, T2P OM9
Telephone 403/263-5020

July 27, 1979

Alberta Environment,
Surface Reclamation Council,
11th Floor Oxbridge Place,
9820 - 106th Street,
Edmonton, Alberta,
T5K 1C2

Attention: Mr. Stan Tracy

Dear Sir:

Subject: Request for Reclamation Certificate
MPCL CDN-SUP Olds 7-3-33-1-W5M
SE¼ Section 3-33-1-W5M
Our File: ASL-032 (55-Canada-4884)

Further to our telephone conversation of today, we now enclose a revised copy of the captioned release agreement dated July 23, 1979 with the consent and surrender clause initialled by the Executors of the Estate.

Yours very truly,

MARATHON PETROLEUM CANADA LTD.

Ross Walker

J. R. Walker,
Associate Landman.

JRW/mcm

Enc.

DEINES MICRO-FILM
SERVICES LTD.

Alberta

ENVIRONMENT

Environmental Coordination Services
Land Conservation and
Reclamation Council

403/427-6207
Telex 037-2006, TWX 610-831-2636
14th Floor, Oxbridge Place
9820 - 106 Street
Edmonton, Alberta, Canada
T5K 2J6

Office of
H. W. Thiessen, Chairman

July 26, 1979

County No. 17

Reclamation Certificate No. 4445

Pursuant to Section 51 subsection (1) of The Land Surface Conservation and Reclamation Act this is to certify that consent has been given to the surrender of the surface lease held by Marathon Petroleum Canada Ltd.

within SE¼ Sec. 3 Tp. 33 Rge. 1 W. 5th Mer.

in connection with or incidental to MPCL Cdn-Sup Olds 7-3-33-1 well, as shown outlined in yellow on the plan attached hereto.

Pursuant to Section 52 subsection (2) of the Act the Council will be holding an inquiry with respect to the condition of the land referred to in this certificate.

Land Conservation and
Reclamation Council

H. W. Thiessen
Chairman

Marathon Petroleum Canada Ltd.
500, 639 - 5th Avenue S.W.
CALGARY, Alberta

DEINES MICRO-FILM
SERVICES LTD.

LAND CONSERVATION AND RECLAMATION COUNCIL

INSPECTION REPORT

SE¼ LS. 7 SEC. 3 TP. 33 RGE. 1 W. 5 MER.

Canada Tem. Trust Co

1. OWNER'S NAME Kathleen Joice Alexander ADDRESS Box 699 Olds AB

IF NOT CONTACTED, INDICATE WHY Contacted; advised us to contact occupant

OWNER'S COMMENTS

2. OCCUPANT'S NAME Ralph Mc Beath ADDRESS Box 731 Olds, AB

IF NOT CONTACTED, INDICATE WHY Contacted

OCCUPANT'S COMMENTS Satisfied

3. RELEASE OBTAINED FROM OWNER/OCCUPANT TO RETAIN N/A

4. COMPANY REPRESENTATIVE CONTACTED: YES NO ✓

COMMENTS

5. ORDER ISSUED YES NO ✓ DATE TIME

WORK REQUIRED

6. TOPOGRAPHY OF ADJACENT AREA AND CURRENT USAGE Quite level

Summerfallow and Crop

7. INSPECTORS COMMENTS Reclamation accep table

8. CONDITION OF LEASE ON FINAL INPSECTION DATE Aug 28/79 TIME 10:00 am

BRUSH None DEBRIS None ROCKS A few SUMP not noticeable

PITS None SOIL Clay Loam CULTIVATION Somewhat marginal CONTOUR Quite level

SEEDING None FENCES None POWER LINES OTHER

COMMENTS

Cultivation was shallow, and subsoil quite hard and some what damp. Occupant informed us that this is a very wet quarter and sometimes difficult to cultivate on account of moisture. He realizes that cultivation should be deeper (~~He plans to do this and subsoil~~) but wants to wait until soil dries up a bit. Occupant appears a good farmer. no need for issuance of an order.

J R Bo
MEMBER

C R Moritz
MEMBER

DEINES MICRO-FILM SERVICES LTD.

August 2, 1979

Marathon Petroleum
Canada Ltd.
500, 639 - 5th Avenue S.W.
CALGARY, Alberta
T2P 0M9

ATTENTION: J. R. Walker

Dear Sir:

RE: MPCL CDN-SUP OLDS 7-3-33-1 WELL
SE¼ SEC. 3 TP. 33 RGE. 1 W. 5TH MER.
YOUR FILE: ASL-032 (55-Canada-4884)

I enclose a copy of Reclamation Certificate No. 4445 dated July 26, 1979.

As required under Section 38 subsection (4) of The Land Surface Conservation and Reclamation Act, a copy of the Certificate has been forwarded to the surface owner.

Yours very truly,

for M. O'Hara

S. Tracy
Secretary

/lh
Encl.

c.c. Kathleen Joyce Haig Alexander (Registered Mail)
Executor of the Will of Robert Morris Alexander (Deceased)
Canada Permanent Toronto General Trust Company
Executor of the Will of Robert Morris Alexander (Deceased)

DEINES MICRO-FILM
SERVICES LTD.

Alberta
ENVIRONMENT
Environmental Coordination Services
Land Conservation and
Reclamation Council
403/427-6212
Telex 037-2006, TWX 610-831-2636
11th Floor, Oxbridge Place
9820 - 106 Street
Edmonton, Alberta, Canada
T5K 2J6

August 31, 1979

RE: MPCL CDN-SUP OLDS 7-3-33-1 WELL
SE¼ SEC. 3 TP. 33 RGE. 1 W. 5TH MER.
RECLAMATION CERTIFICATE NO. 4445

An inquiry has been held pursuant to Section 52 subsection (2) of The Land Surface Conservation and Reclamation Act with respect to the condition of the land referred to in the above Reclamation Certificate and there is no requirement for the issue of a Reclamation Order under Section 39 of the Act.

Land Conservation and
Reclamation Council

C. A. Moritz
Member

J. R. Gamache
Member

Marathon Petroleum Canada Ltd.
500, 639 - 5th Avenue S.W.
CALGARY, Alberta

Copy sent to: Kathleen Joyce Haig Alexander Executor of the (Registered Mail)
Will of Robert Morris Alexander (Deceased)
Canada Permanent Toronto General Trust Company
Executor of the Will of Robert Morris Alexander (Deceased)

DEINES MICRO-FILM
SERVICES LTD.

APPENDIX E

Land Titles

Bifröst

Environmental and Remediation Services Inc.

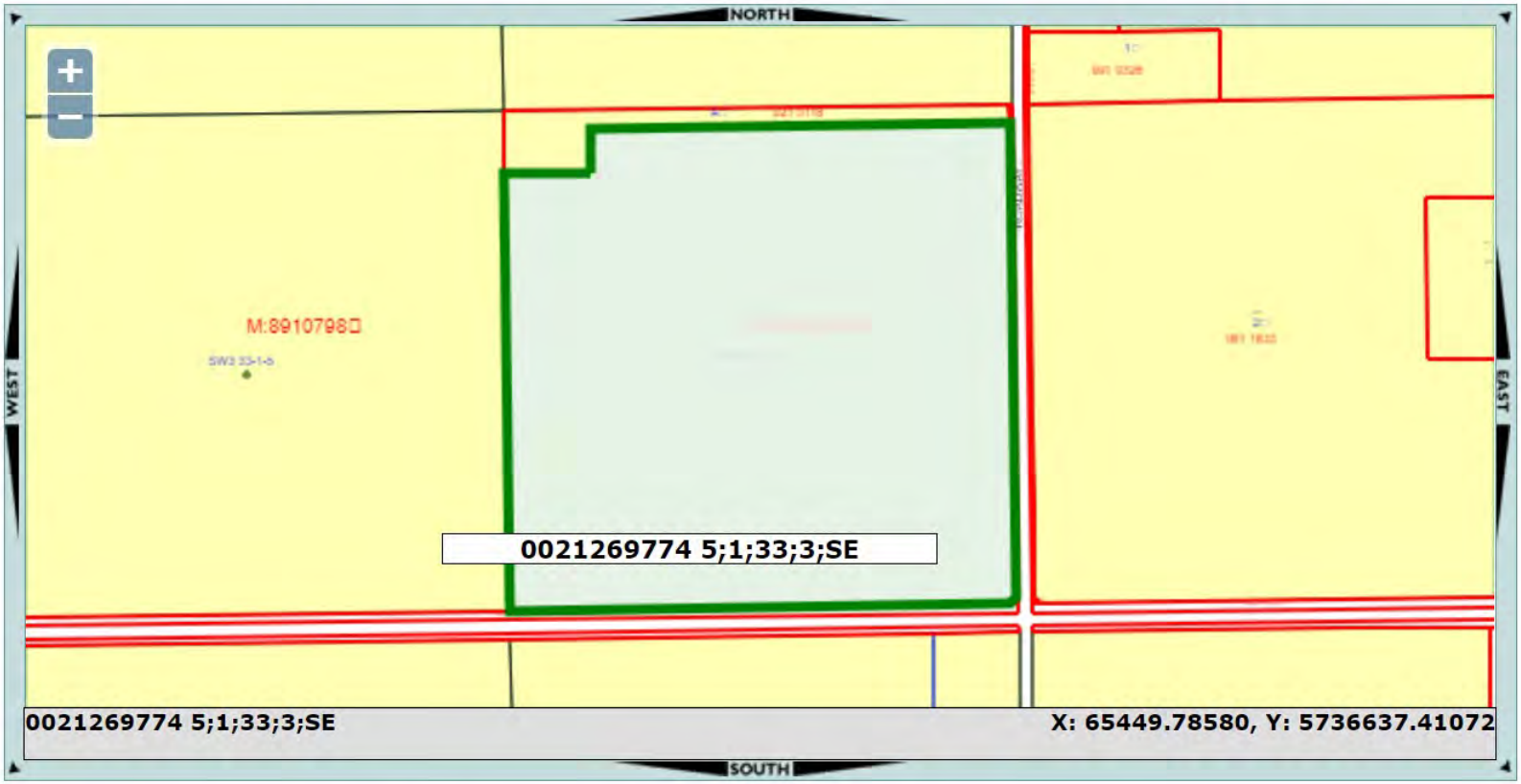
APPENDIX E1

Land Titles –

SE 3-33-1W5m and Block A

Bifröst

Environmental and Remediation Services Inc.



NAVIGATE | TOOLS | POLYGON SELECT

Parcel Select | Titles | Plans | ASCM | Buffer Size (m)

THEMES | FIND | LEGEND

Select Search Type:

Survey Plan

Plan Number:

Find

Preset Map

Rural Detail	Alberta Map
Urban Detail	Regional Map

Go back to search page.



NAVIGATE | TOOLS | POLYGON SELECT

Parcel Select | Titles | Plans | ASCM | Buffer Size (m)

THEMES | FIND | LEGEND

Select Search Type:
Survey Plan

Plan Number:

Find

Preset Map

Rural Detail | Alberta Map
Urban Detail | Regional Map

Go back to search page.

ALBERTA GOVERNMENT SERVICES
LAND TITLES OFFICE

IMAGE OF DOCUMENT REGISTERED AS:

891156290

ORDER NUMBER: 49248975

ADVISORY

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Memorandum of Encumbrances

891156290 REGISTERED 1989 8 11
UTRW - UTILITY RIGHT OF WAY
001 OF 0001 ADR/SOUTH4

RICHARDSON BROS. (OLDS) LTD.

— TO —
TransAlta Utilities Corporation

Easement

I certify that the within instrument is duly Entered and Registered in the Land Titles Office for the South Alberta Land Registration District at Calgary.

Registrar
SALRD

W.O. NUMBER 11507-96605

FILE NUMBER

AFFIDAVIT OF EXECUTION

CANADA
PROVINCE OF ALBERTA

I, MACK A. HOLT.
of the CITY OF CALGARY, in the Province of Alberta
LANDAGENT. make oath and say:
(Occupation)

TO WIT:

1. THAT I was personally present and did see ~~RICHARDSON BROS. (OLDS) LTD.~~ JACK P. RICHARDSON named in the within instrument, who is personally known to me to be the person named therein, duly sign and execute the same for the purposes named therein.
2. THAT the same was executed at the TOWN of OLDS in the Province of Alberta and that I am the subscribing witness thereto.
3. THAT I know the said PERSON and ~~THEY ARE~~ ~~HE IS~~ he is in my belief of the full age of eighteen years.

SWORN before me at the CITY of CALGARY in the Province of Alberta, this 2 day of JULY A.D. 19 89.

A Commissioner for Oaths or Notary Public

MARSHALL McCARTHY
A Commissioner for Oaths
In and for the Province of Alberta
My Commission expires June 25, 1992

Appointment Expires

AFFIDAVIT OF EXECUTION

CANADA
PROVINCE OF ALBERTA

I, Kari Hass
of the City of Calgary, in the Province of Alberta ~~Land Agent~~ make oath and say:
(Occupation)

TO WIT:

1. THAT I was personally present and did see R.A. Molyneaux and Marcel J. Charel duly sign and execute the within instrument on behalf of TransAlta Utilities Corporation, the Grantee, for the purposes named therein both of whom are known to me to be duly authorized to execute the same as aforesaid.
2. THAT the same was executed at the City of Calgary, in the Province of Alberta, and that I am the subscribing witness thereto.

SWORN before me at the City of Calgary in the Province of Alberta, this 28 day of July A.D. 19 89

Kari Hass.

A Commissioner for Oaths or Notary Public

WAYNE J. SCHEER
COMMISSIONER FOR OATHS
APPOINTMENT EXPIRES:
Nov 25/89

Appointment Expires

GP-83

The Land Titles Act

EASEMENT FOR RIGHT – OF – WAY TO TransAlta Utilities Corporation

RICHARDSON BROS. (OLDS) LTD.

Postal Address BOX 309, OLDS, ALBERTA, TOM 1PO

(hereinafter called "the Grantor") being registered owner of an estate in fee simple, subject however, to such encumbrances, liens and interests as are notified by memorandum on the certificate of title, in all that certain tract of land situated in the Province of Alberta, being composed of:

THE SOUTH EAST QUARTER OF SECTION THREE (3) TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS.

EXCEPTING THEREOUT:

PLAN	NUMBER	HECTARES (MORE OR LESS)	ACRES
CONNECTING HIGHWAY	7027 H.X.	1.20	2.97
ROADWAY	8110708	0.409	1.01
ROAD	8710934	0.005	0.01

EXCEPTING THEREOUT ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME.

(hereinafter called "the Lands".)

DO HEREBY in consideration of the sum of---------- DOLLARS ----------NINE HUNDRED---------- ($ 900.00) paid to me or others interested in the Lands by encumbrances or otherwise, the receipt whereof is hereby acknowledged, and in consideration of the covenants and conditions hereinafter contained to be kept and performed by TransAlta Utilities Corporation a Corporation having its head office at 110-12th Avenue S.W., in the City of Calgary, in the Province of Alberta (hereinafter called "the Grantee") grant and transfer unto and to the Grantee the right, liberty, privilege and easement of a right-of-way within, upon or over the Lands:

~~(a) as such right-of-way is shown on a Plan of record in the office of the Registrar of the Alberta Land Registration District as filed Plan No. containing acres more or less,~~

OR

(b) as such right-of-way is described as follows:

ALL THAT PORTION OF THE SAID QUARTER LYING TO THE WEST OF A LINE DRAWN PARALLEL TO THE WEST BOUNDRY THEREOF FIVE (5) METRES PERPENDICULAR DISTANCE EASTERLY THEREFROM AND TO THE NORTH OF THE NORTH LIMIT OF HIGHWAY PLAN 7027 H.X.

URW to TAU (Plan as desc)

(hereinafter called "Right-of-way").

for the erection, installation, construction, operation, maintenance, inspection, patrol, replacement, reconstruction, relocation, alteration and repair of its electrical power lines and all works, equipment, apparatus and appurtenances as may be necessary or convenient in connection therewith for the conveyance of electrical energy within, upon or over the Right-of-way, together with the rights over the Lands of ingress to and egress from the Right-of-way for all purposes incidental to this grant and where the Grantee reasonably considers it necessary by reason of the nature or condition of the Lands or the circumstances then existing the Grantee shall have the right to go on or across all or any part of the Lands for the purpose of gaining access to the Right-of-way and for the purpose of constructing, reconstructing, repairing, replacing, relocating or protecting its works, as and from the date hereof and for so long hereafter as the Grantee may desire to exercise the rights and privileges hereby granted, on the following terms and conditions:

FIRST: The rights and privileges hereby granted shall include, without limiting the generality of the foregoing, the right to erect, install, construct, operate, maintain, inspect, patrol, remove, replace, reconstruct, relocate, alter and repair on the Right-of-way such electrical power lines, wire conductors, apparatus, single or multiple poles, standards, structures, steel towers, equipment, anchors, guy wires, works or appurtenances (hereinafter collectively called "the Works") as the Grantee may deem necessary for the full enjoyment of any or all of the rights and privileges herein granted: PROVIDED HOWEVER, until the prior written consent of the Grantor has been obtained, the Grantee shall not, unless it is reconstructing, relocating, altering or replacing its electrical power lines as permitted in the Fourth Clause, maintain at any one time within, upon or over the Right-of-way more structures and/or anchors than:

(a) on a cultivated area of the Right-of-way as it at present exists ----------
----------EIGHT (8) SINGLE POLES--------(insert number and type of structure).
(b) on an uncultivated area of the Right-of-way as it at present exists NIL
(insert number and type of structure).
(c) on a cultivated area of the Right-of-way as it at present exists ONE (1) anchors.
(d) on an uncultivated area of the Right-of-way as it at present exists NIL anchors.
(e) overhanging wires and/or cross arms only with no structures or anchors.

IT BEING FURTHER UNDERSTOOD AND AGREED by and between the Grantor and the Grantee that as and when the said uncultivated area upon which the structures and/or anchors are constructed becomes cultivated, the Grantee shall pay to the Grantor an additional sum of NIL DOLLARS ($ NIL) for each tower or for each pole in each structure referred to in (b) and an additional sum of NIL DOLLARS ($ NIL) for each anchor referred to in (d).

FORM 31.1

LAND TITLES ACT
(Section 152.3)

AFFIDAVIT VERIFYING
CORPORATE SIGNING AUTHORITY

I, JACK RICHARDSON of Box 309 OLDS ALBERTA
make oath and say:

1. I am an officer or a director of RICHARDSON BROS (OLDS) LTD named in the within or annexed instrument (or caveat).

2. I am authorized by the corporation to execute the instrument (or caveat) without affixing a corporate seal.

SWORN before me at OLDS)
in the PROVINCE OF ALBERTA)
this 18 day of JULY.)

J.J. Richardson
Signature

MACK L. HOLT
COMMISSIONER FOR OATHS
APPOINTMENT EXPIRES:
JUNE 25, 1990

D701/1/30

(a) on a cultivated area of the Right-of-way as it at present exists ----------
----------EIGHT (8) SINGLE POLES-------(insert number and type of structure).
(b) on an uncultivated area of the Right-of-way as it at present exists NIL
(insert number and type of structure).
(c) on a cultivated area of the Right-of-way as it at present exists ONE (1) anchors.
(d) on an uncultivated area of the Right-of-way as it at present exists NIL anchors.
(e) overhanging wires and/or cross arms only with no structures or anchors.

IT BEING FURTHER UNDERSTOOD AND AGREED by and between the Grantor and the Grantee that as and when the said uncultivated area upon which the structures and/or anchors are constructed becomes cultivated, the Grantee shall pay to the Grantor an additional sum of NIL
DOLLARS ($ NIL) for each tower
or for each pole in each structure referred to in (b) and an additional sum of NIL
DOLLARS ($ NIL) for each anchor referred to in (d).

SECOND: The Grantee, its tenants, officers, agents, servants, employees, contractors and licensees, with or without animals, vehicles, tools, equipment, apparatus and materials of whatsoever nature and kind, shall have the full, free and uninterrupted right to enter upon, use and occupy the Right-of-way for all purposes connected with, or incidental to, the rights and privileges herein granted including, without limitation, the right to load, unload and store material, apparatus and equipment upon the Right-of-way, to roll and unroll wire thereon and to make and keep the Lands free from bush, trees, growths, water and other obstructions that, in the reasonable opinion of the Grantee, may endanger the Works. Where the Grantee reasonably considers it necessary by reason of the nature or condition of the Lands or the circumstances then existing, the Grantee shall have the right to go on or across all or any part of the Lands for the purpose of gaining access to the Right-of-way and for the purpose of constructing, reconstructing, repairing, replacing or protecting its Works.

THIRD: The Grantee will exercise its rights hereunder in a proper and workmanlike manner so as to do as little injury as possible to the Lands and will keep and maintain the Works in good repair and will at the termination of this grant take down, dismantle and remove from the Right-of-way all of the Works and will fill up any holes caused by such removal and restore the surface of the Lands as far as may be reasonable and possible.

FOURTH: The Grantee without paying any additional consideration shall be entitled to erect upon the Right-of-way such Works as it may deem necessary for the purpose of reconstructing, relocating or replacing its electrical power lines or any part thereof within, upon or over the Right-of-way; PROVIDED HOWEVER, the Grantee will, as soon as practicable under the circumstances, take down, dismantle and remove all Works that are no longer required for its reconstructed, relocated, or replaced electrical power lines and will fill up all holes caused by such removal and restore the surface of the Lands as far as may be reasonable and possible; it being agreed that upon completion the number of structures and/or anchors comprising or forming part of the Works shall not exceed the number of structures and/or anchors authorized in the First Clause.

FIFTH: The Grantee will at all times hereafter indemnify the Grantor against all actions, claims and demands that may be lawfully brought or made against the Grantor by reason of anything done by the Grantee, or any person claiming through or under the Grantee, in the exercise or purported exercise of any or all of the rights and privileges hereby granted.

SIXTH: The Grantee will compensate for physical damage done to real or personal property of the Grantor by reason of the exercise of any or all of the rights and privileges herein granted.

SEVENTH: The Grantee may provide gates and shall, if requested by the Grantor, furnish the same with a lock, in every fence now or hereafter constructed across the Right-of-way, such gates to be of sufficient width to admit the passage of an ordinary vehicle.

EIGHTH: The Grantee shall not fence the Right-of-way or any portion thereof and the Grantor shall have free access to, and use of, the Lands comprised in the Right-of-way; PROVIDED HOWEVER, that such access and use in favour of the Grantor shall not in any way interfere with, restrict, hinder, impede, obstruct or molest the Grantee in the exercise of any of the Rights and privileges herein granted or any Works of the Grantee situate within, upon or over the Right-of-way, and to that end the Grantor covenants not to erect upon the Right-of-way any buildings, structures or other obstructions that, in the reasonable opinion of the Grantee, may in any way interfere with the safe and efficient conveyance of electrical energy within, upon or over the Right-of-way.

NINTH: The Grantor covenants with the Grantee that upon the Grantee, its successors and assigns performing and observing the covenants and conditions on its part to be performed and observed, the Grantee, its successors and assigns, shall peaceably hold and enjoy the rights, liberties, privileges and easement hereby granted during the period as aforesaid.

TENTH: This grant is and shall be of the same force and effect to all intents and purposes as a covenant running with the Lands.

IT IS UNDERSTOOD AND AGREED by and between the parties hereto that this Grant and all the covenants and conditions herein contained, shall extend to, be binding upon and enure to the benefit of the executors, administrators, successors and assigns of the Grantor, the owner or owners for the time being of the Lands (including the Purchaser, if any, whose consent is hereunto annexed) and the

successors and assigns of the Grantee, and wherever the singular or masculine is used throughout this Grant, the same shall be construed as meaning plural or feminine or a body corporate where the context or the parties hereto so admit or require.

IN WITNESS WHEREOF
the Grantor has hereunto set his hand and seal, (or, if a body corporate, has hereunto caused to be affixed its corporate seal duly attested by the hands of its proper officers duly authorized in that behalf) and TransAlta Utilities Corporation, the Grantee, has caused these presents to be executed by its proper officers duly authorized in that behalf this 18TH. day of July A.D. 1989.

SIGNED, SEALED and DELIVERED by the above-named Grantor in the presence of

J F Richardson
RICHARDSON BROS. (OLDS) LTD.

and by R.A. Molyneaux and M.J. Ehorel on behalf of TransAlta Utilities Corporation (by virtue of a Power of Attorney of record in the Land Titles Office, enabling them in that behalf), in the presence of:

Kari Hess.

TransAlta Utilities Corporation

Per R.A. Molyneaux
Attorney

Per M.J. Ehorel
Attorney

CHECKED

DOWER
CONSENT OF SPOUSE

I, ...being married to the within named .....do hereby give my consent to the disposition of our homestead, made in the within instrument, and I have executed this document for the purpose of giving up my life estate and other dower rights in the said property given to me by the Dower Act, to the extent necessary to give effect to the said disposition.

.....

CERTIFICATE OF ACKNOWLEDGEMENT BY SPOUSE

1. This document was acknowledged before me by .....
.....apart from her husband/his wife.
2. .....Acknowledged to me that she/he
   (a) Is aware of the nature of the agreement.
   (b) Is aware that the Dower Act gives her/him a life estate in the homestead and the right to prevent disposition of the homestead by withholding consent.
   (c) Consents to the agreement for the purpose of giving up the life estate and other dower rights in the homestead given to her/him by the Dower Act to the extent necessary to give effect to the said agreement.
   (d) Is executing the document freely and voluntarily without any compulsion on the part of her husband/his wife.

DATED at the.....of.....in the Province of Alberta this .....day of .....A.D. 19.....

A Commissioner for Oaths or Notary Public — Appointment Expires

AFFIDAVIT

I, ...of.....
in the Province of Alberta.....make oath and say:
(Occupation)

1. THAT I am the Grantor named in the within instrument.
2. THAT I am not married.

(or) 2. THAT neither myself nor my spouse has resided on the within mentioned land at any time since our marriage.

SWORN before me at the .....of .....in the Province of Alberta.....day of .....A.D. 19.....

.....

A Commissioner for Oaths or Notary Public — Appointment Expires

ALBERTA GOVERNMENT SERVICES
LAND TITLES OFFICE

IMAGE OF DOCUMENT REGISTERED AS:

921013813

ORDER NUMBER: 49248975

ADVISORY

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9210118

SUBP - SUBDIVISION PLAN 9210118
DOC 1 OF 2 DRM: 3720127 ADR/SRICHARD
LNT/AS: 0021154313

COUNTY OF MOUNTAIN VIEW NO. 17

PLAN SHOWING

SUBDIVISION

OF PART OF THE

SE1/4 SEC. 3, TWP.33, RGE.1, W5M

1-2

Alberta
ATTORNEY GENERAL

DOCUMENT REGISTRATION REQUEST

LAND TITLES OFFICE

92-108

☒ BOX 7575 CALGARY, ALBERTA T2P 2H4 ☐ BOX 2330 EDMONTON, ALBERTA T5J 2T3

NAME	TO CALL BOX	ACCOUNT NUMBER	CASH
POLLOCK SURVEYS		[redacted]	
ADDRESS	MAIL	DATE	
Box 2235	XXX	Jan.14/92	
Olds, AB / POSTAL CODE: TOM IPO / TELEPHONE: 5563113	SIGNATURE	R M Pollock	

CUSTOMER'S SPECIAL INSTRUCTIONS AND LEGAL DESCRIPTION

CLIENT'S FILE NO S08490

Re: Subdivision of Pt. of SE 1/4 Sec.3-33-1-5

RECEIVED
JAN 17 1992
CALGARY L.T.O.

Please register the enclosed plan

Please find enclosed Service Request for prints

☒ D.C.T. ENCLOSED - PLEASE RETURN 2 new DCTS

	DOCUMENTS IN ORDER OF PRIORITY	EXTRA TITLES/ REFS	REGISTRATION FEES	OTHER SERVICES DESCRIPTION	OTHER SERVICES FEES	REGISTRATION NUMBER
1			$		$	1
2						2
3						3
4						4
5						5
	L.T.O. USE ONLY		SUB-TOTAL $		SUB-TOTAL $	TOTAL FEES $

☐ D.C.T. Enclosed

☐ D.C.T. Not Enclosed

_____, 19____

_____
A.D. Registrar

REASONS FOR REJECTION

PLEASE RE-SUBMIT DOCUMENTS WITH THIS FORM AND ☐ Duplicate Certificate of Title ☐ Registration Fee

☐ 1. Require $_____ for registration.
☐ 2. Require duplicate certificate of title.
☐ 3. Require foreign ownership of land declaration.
☐ 4. Require address for_____
☐ 5. Incorrect legal description.
☐ 6. Require evidence re infants (section 120, Land Titles Act).
☐ 7. Caveat must claim an interest in land.
☐ 8. Caveat must state nature of interest claimed and grounds on which claim is founded (section 131, Land Titles Act).
☐ 9. Title also subject to_____
☐ 10. General Register search reveals attached registrations.
☐ 11. Require discharge of tax notification or consent of taxing authority.
☐ 12. Sign, seal, swear, complete or correct_____

13. Comments and other reasons for rejection.

_____
A.D. Registrar

Team # _____

_____, 19____

A.G. 1044(Rev. Nov./84) A

REGISTER

2720127

Alberta
ATTORNEY GENERAL

DOCUMENT REGISTRATION REQUEST

LAND TITLES OFFICE

92-108

☒ BOX 7575 CALGARY, ALBERTA T2P 2H4 ☐ BOX 2280 EDMONTON, ALBERTA T5J 2T3

NAME		TO CALL BOX	ACCOUNT NUMBER	CASH
POLLOCK SURVEYS			[redacted]	
ADDRESS		MAIL	DATE	
Box 2235		XXX	Jan.14/92	
Olds, AB	POSTAL CODE TOM 1P0 / TELEPHONE 5563113	SIGNATURE	R M Pollock	

CUSTOMER'S SPECIAL INSTRUCTIONS AND LEGAL DESCRIPTION

CLIENT'S FILE NO S08490

Re: Subdivision of Pt. of SE 1/4 Sec.3-33-1-5

RECEIVED

Please register the enclosed plan

JAN 17 1992

Please find enclosed Service Request for prints

CALGARY L.T.O.

☒ D.C.T. ENCLOSED - PLEASE RETURN 2 new DCTS

	DOCUMENTS IN ORDER OF PRIORITY	EXTRA TITLES/ REFS	REGISTRATION FEES	OTHER SERVICES DESCRIPTION	OTHER SERVICES FEES	REGISTRATION NUMBER
1			$		$	1
2						2
3						3
4						4
5						5
			SUB-TOTAL $		SUB-TOTAL $	TOTAL FEES $

L.T.O. USE ONLY

☐ D.C.T. Enclosed

☐ D.C.T. Not Enclosed

_____, 19____

_____
A.D. Registrar

REASONS FOR REJECTION

PLEASE RE-SUBMIT DOCUMENTS WITH THIS FORM AND ☐ Duplicate Certificate of Title ☐ Registration Fee

☐ 1. Require $ _____ for registration.

☐ 2. Require duplicate certificate of title.

☐ 3. Require foreign ownership of land declaration.

☐ 4. Require address for _____

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☐ 8. Caveat must state nature of interest claimed and grounds on which claim is founded (section 131, Land Titles Act).

☐ 9. Title also subject to _____

☐ 10. General Register search reveals attached registrations.

☐ 11. Require discharge of tax notification or consent of taxing authority.

☐ 12. Sign, seal, swear, complete or correct _____

13. Comments and other reasons for rejection.

_____

_____

_____

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_____

_____

_____

_____
A.D. Registrar

Team # _____

_____, 19____

A.G. 1844(Rev. Nov./84) A

REGISTER

2720127

Alberta
ATTORNEY GENERAL

DOCUMENT REGISTRATION REQUEST

LAND TITLES OFFICE

92-108

☒ BOX 7575 CALGARY, ALBERTA T2P 2H4 ☐ BOX 2380 EDMONTON, ALBERTA T5J 2T3

NAME		TO CALL BOX	ACCOUNT NUMBER	CASH
POLLOCK SURVEYS			[redacted]	
ADDRESS		MAIL	DATE	
Box 2235		XXX	Jan.14/92	
Olds, AB	POSTAL CODE TOM IPO / TELEPHONE 5563113	SIGNATURE	R M Pollock	

CUSTOMER'S SPECIAL INSTRUCTIONS AND LEGAL DESCRIPTION

CLIENTS FILE NO S08490

Re: Subdivision of Pt. of SE 1/4 Sec.3-33-1-5

Plese register the enclosed plan

Please find enclosed Service Request for prints

RECEIVED
JAN 17 1992
CALGARY L.T.O.

☒ D.C.T. ENCLOSED - PLEASE RETURN 2 new DCTS

	DOCUMENTS IN ORDER OF PRIORITY	EXTRA TITLES/ REFS	REGISTRATION FEES	OTHER SERVICES DESCRIPTION	OTHER SERVICES FEES	REGISTRATION NUMBER
1			$		$	1
2						2
3						3
4						4
5						5
			SUB-TOTAL $		SUB-TOTAL $	TOTAL FEES $

L.T.O. USE ONLY

☐ D.C.T. Enclosed

☐ D.C.T. Not Enclosed

_____, 19____

_____
A.D. Registrar

REASONS FOR REJECTION

PLEASE RE-SUBMIT DOCUMENTS WITH THIS FORM AND ☐ Duplicate Certificate of Title ☐ Registration Fee

☐ 1. Require $ _____ for registration.
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☐ 4. Require address for _____
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☐ 8. Caveat must state nature of interest claimed and grounds on which claim is founded (section 131, Land Titles Act).
☐ 9. Title also subject to _____
☐ 10. General Register search reveals attached registrations.
☐ 11. Require discharge of tax notification or consent of taxing authority.
☐ 12. Sign, seal, swear, complete or correct _____

13. Comments and other reasons for rejection.

_____
A.D. Registrar

Team # _____

_____, 19 ____

A.O. 1044(Rev. Nov./84)

REGISTER

2720127

PLAN

SUBDIVISION INSTRUMENT

MUNICIPALITY: County of Mountain View

LEGAL: SE 3 - 33 - 1 - 5

PAGE 1 OF 1

CERTIFICATE OF TITLE NUMBER	HECTARES (ACRES)	COMMENTS
881 236 107	3 40 (8 40)	

ISSUE 1 NEW C. OF T.S TO SELF

FOR:

REF. TITLE NO.	BLOCK	LOT(S)	HECTARES (ACRES)	INSTRUMENTS
4	A	/	3 40	A 11

ISSUE NEW C. OF T.S TO

FOR:

AG 1854 (Rev. Dec/05)

REGISTRATION REPORT
FOR
SUBDIVISION PLAN
9210118

MUNC: COUNTY OF MOUNTAIN VIEW NO. 17

TITLES AFFECTED:

TITLE NUMBER	EST	RIGHTS	LINC	LAND ID	CANCELLED AS TO: (SURFACE) FULL/PART	INSTRUMENTS DROPPED FROM REMAINDER
881236107	FS	S	0021154919	5;1;33;3;SE	P	

NEW TITLES CREATED FOR SELF:

NEW BLOCK #:	NEW LOT #:		LAND AREA(HECTARES)
A			3.4000

TITLES SELECTED (Y/N):	LIST OF REF #S:	INST. CARRIED FWD
Y	881236107	A

HISTORICAL LAND TITLE CERTIFICATE

TITLE CANCELLED ON JANUARY 21,1992

S

LINC	SHORT LEGAL	TITLE NUMBER
0021 154 919	5;1;33;3;SE	881 236 107

LEGAL DESCRIPTION

MERIDIAN 5 RANGE 1 TOWNSHIP 33
SECTION 3
QUARTER SOUTH EAST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT

PLAN	NUMBER	HECTARES (MORE OR LESS)	ACRES
CONNECTING HIGHWAY	7027HX	1.20	2.97
ROADWAY	8110708	0.409	1.01
ROAD	8710934	0.005	0.01

EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME

ESTATE: FEE SIMPLE

MUNICIPALITY: MOUNTAIN VIEW COUNTY

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
881 236 107	30/12/1988			$135,000

OWNERS

RICHARDSON BROS (OLDS) LIMITED.
OF BOX 309
OLDS
ALBERTA T0M 1P0

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
881 236 108	30/12/1988	REQUEST FOR RELEASE OF D.C.T. DCT ISSUED SURRENDERED BY 921013813

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
891 156 290	11/08/1989	UTILITY RIGHT OF WAY GRANTEE - TRANSALTA UTILITIES CORPORATION. "PORTION AS DESCRIBED"
921 013 813	21/01/1992	SUBDIVISION PLAN 9210118 TITLE CANCELLED AS TO PART AND NEW TITLE ISSUED FOR THE REMAINDER

TOTAL INSTRUMENTS: 003

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 4 DAY OF JANUARY, 2024 AT 09:46 A.M.

ORDER NUMBER: 49248975

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER, SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION, APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).

ALBERTA GOVERNMENT SERVICES
LAND TITLES OFFICE

IMAGE OF DOCUMENT REGISTERED AS:

051022715

ORDER NUMBER: 49248975

ADVISORY

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Macleod Dixon LLP
Lawyers
Calgary Almaty
Toronto Caracas
Moscow Rio de Janeiro

3700 Canterra Tower
400 Third Avenue SW
Calgary, Alberta
Canada T2P 4H2

Main: (403) 267-8222
Fax: (403) 264-5973

www.macleoddixon.com

Our File: 193107/SGR

Stephen G. Raby, Q.C.
Direct Phone: (403) 267-8226
E-mail: rabys@macleoddixon.com

Linda Meunier
Assistant
Direct Phone: (403) 267-8227
E-mail: meuniel@macleoddixon.com

January 10th, 2005

The Registrar
South Alberta Land Registration District
710 – 4th Avenue, S.W.
Calgary, Alberta
T2P 0K3

Dear Sirs:

Re: FORTIS ALBERTA INC.

We are the solicitors for FortisAlberta Inc.

Utilicorp Networks Canada (Alberta) Ltd. is the grantee named in the utility right-of-ways described in the attached Schedule "A". Utilicorp Networks Canada (Alberta) Ltd. has changed its name to Aquila Networks Canada (Alberta) Ltd. and such name change has been registered in the South Alberta Land Titles Office as Instrument Number 021 200 111. Aquila Networks Canada (Alberta) Ltd. has changed its name to FortisAlberta Inc. and such name change has been registered in the South Alberta Land Titles Office as Instrument Number 041 207 421.

We would ask that you kindly change the name of the grantee named in the utility right-of-ways on the attached Schedule "A" to FortisAlberta Inc.

Yours very truly,
Macleod Dixon LLP

Stephen G. Raby
SGR/lmm
Encls.

Macleod Dixon, Cabinets de Avocats membres de Macleod Dixon, Sociétés de projets Macleod Dixon Consultores Empresariales Estrangeiros

BA 35546

UTILITY RIGHTS-OF-WAY REGISTRATION NOS. (SOUTH ALBERTA)

891156290
891158623
891158635
891158637
891164758
891165978
891165979



051022715 REGISTERED 2005 01 18
CHAN - CHANGE OF NAME
DOC 1 OF 1 DRR#: BA35546 ADR/SLEFEBVR
LINC/S: 0020410379 +

ALBERTA GOVERNMENT SERVICES
LAND TITLES OFFICE

IMAGE OF DOCUMENT REGISTERED AS:

061030140

ORDER NUMBER: 49248975

ADVISORY

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R16W

OGC-0001(04)

CAVEAT FORBIDDING REGISTRATION

TO THE REGISTRAR OF THE SOUTH ALBERTA LAND REGISTRATION DISTRICT

TAKE NOTICE that OLDS GOLF CLUB ASSOCIATION, of Olds, in the Province of Alberta, claims a leasehold estate or interest in and to the undermentioned lands by virtue of an Alberta Right of Way Agreement covering less than 20 acres for a **WATER PIPELINE** dated the **13TH** day of **SEPTEMBER, 2004** between:

RICHARDSON BROS (OLDS) LIMITED

and the Caveator. The lands affected by the said Agreement are situated in the Province of Alberta and are described as follows:

FIRST: MERIDIAN 5 RANGE 1 TOWNSHIP 32
SECTION 34
QUARTER NORTH EAST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT:
A) COMMENCING AT THE INTERSECTION OF THE SOUTH LIMIT OF THE HIGHWAY PLAN 7027HX WITH THE EAST BOUNDARY OF SAID QUARTER SECTION; THENCE WESTERLY ALONG SAID SOUTH LIMIT 137 METRES; THENCE SOUTHERLY AND AT RIGHT ANGLES TO SAID SOUTH LI MIT 194.5 METRES; THENCE EASTERLY AND PARALLEL WITH SAID SOUTH LIMIT TO THE EAST BOUNDARY OF SAID QUARTER SECTION; THENCE NORTHERLY ALONG THE EAST BOUNDARY OF SAID QUARTER SECTION TO THE POINT OF COMMENCEMENT, CONTAINING 2.665 HECTARES (6.58 ACRES) MORE OR LESS

B) PLAN	**NUMBER**	**HECTARES (MORE OR LESS)**	**ACRES**
CONNECTING HIGHWAY	**7027HX**	**0.858**	**2.12**

EXCEPTING THEREOUT ALL MINES AND MINERALS

SECOND: MERIDIAN 5 RANGE 1 TOWNSHIP 33
SECTION 3
QUARTER SOUTH EAST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT

PLAN	**NUMBER**	**HECTARES (MORE OR LESS)**	**ACRES**
CONNECTING HIGHWAY	**7027HX**	**1.20**	**2.97**
ROADWAY	**6110708**	**0.409**	**1.01**
ROAD	**6710934**	**0.005**	**0.01**
SUBDIVISION	**9210118**	**3.40**	**8.40**

EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME

THIRD: PLAN 9210118
BLOCK A
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 3.4 HECTARES (8.4 ACRES) MORE OR LESS

being the lands described in Certificate(s) of Title No(s): **881 236 107 A, 921 013 813 +1 AND 921 013 813** standing in the register in the name of:

RICHARDSON BROS (OLDS) LIMITED

and it forbids the registration of any person as Transferee or owner of, or of an instrument affecting the said estate or interest, unless the instrument or Certificate of Title, as the case may be is expressed to be subject to its claim.

IT APPOINTS, R.R. #1, SITE 2, BOX 13, OLDS, ALBERTA T4H 1PZ, as the place at which notices and proceedings relating hereto may be served.

T4H 1PZ

DATED this 13TH day of JANUARY, A.D., 2006 .

OLDS GOLF CLUB ASSOCIATION

Val McGeachie

Agent **VAL MCGEACHIE**

CANADA)
PROVINCE OF ALBERTA)
TO WIT:)

I, **VAL MCGEACHIE,** of the City of Calgary, in the Province of Alberta, **Land Administrator,** MAKE OATH AND SAY:

1. THAT I am agent for the above named Caveator.
2. THAT I BELIEVE THAT THE SAID Caveator has a good and valid claim upon the said lands and I say that this Caveat is not being filed for the purpose of delaying or embarrassing any person interested therein or proposing to deal therewith.

Dal McGeachie
VAL MCGEACHIE

SWORN before me at
the City of Calgary in
the Province of Alberta this
13TH day of JANUARY, 2006

A Commissioner for Oaths in and for the Province of Alberta.

JULIE A. GILLARD
A Commissioner for Oaths in and for
the Province of Alberta
My Appointment Expires April 13, 2006

061030140 REGISTERED 2006 01 19
CAVE - CAVEAT
DOC 1 OF 1 DRR#: 3319615 ADR/SABDALLA
LINC/S: 0021145082 +

ALBERTA GOVERNMENT SERVICES
LAND TITLES OFFICE

IMAGE OF DOCUMENT REGISTERED AS:

081053277

ORDER NUMBER: 49248975

ADVISORY

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Please contact the Land Titles Office at (780) 422-7874 if the image of the document is not legible.

08/02/08
BL

TRANSFER OF LAND

RICHARDSON BROS (OLDS) LIMITED. OF BOX 309 , OLDS, AB T0M 1P0 being registered owner of an estate in FEE SIMPLE, subject however to such encumbrances, liens and interests as are notified by memorandum underwritten in all that certain tract of land situate in the Province of Alberta, and being:

FIRSTLY:

MERIDIAN 5 RANGE 1 TOWNSHIP 33
SECTION 3
QUARTER SOUTH EAST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT

PLAN	NUMBER	HECTARES(MORE OR LESS)	ACRES
CONNECTING HIGHWAY	7027HX	1.20	2.97
ROADWAY	8110708	0.409	1.01
ROAD	8710934	0.005	0.01
SUBDIVISION	9210118	3.40	8.40

EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME

SECONDLY:

PLAN 9210118
BLOCK A
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 3.4 HECTARES (8.4 ACRES) MORE OR LESS

do hereby in consideration of the sum of THREE MILLION ---------- 00/100 ($ 3,000,000.00) DOLLARS paid to it by:

Abe Neufeld as to an undivided Forty Two and one-half percent, 1273927 Alberta Ltd. as to an undivided Forty ~~Ten~~ Two and one-half percent and ~~40408~~ Alberta Ltd. as to an undivided Fifteen percent interest, whose mailing address is c/o Style Realty Inc. Box 35009, Sarcee Postal Outlet, Calgary, Ab., T3E 7C7

hereinafter called the "Transferee", the receipt of which sum it hereby acknowledges, transfers to the said Transferee all its estate and interest in the said piece of land.

IN WITNESS WHEREOF the Company has hereunto affixed its Corporation Seal by the hands of its proper officers, at the Town of Olds, in the Province of Alberta, on the 11 day of January, 2008.

David J. Webber
Barrister & Solicitor
300, 1121 Centre St. N.
Calgary, Ab., T2E 7K6

change made by

at the request of the Solicitor for the Transferor

RICHARDSON BROS (OLDS) LIMITED.

Frank Richardson

Stephen Richardson

AFFIDAVIT OF TRANSFEREE

CANADA

PROVINCE OF ALBERTA

TO WIT:

I, John Froese.
of Winkler, Manitoba.
in the Province of Alberta, MAKE OATH AND SAY :

1. That I am (one of) the Transferee(s) (agent of the Transferee(s)) named in the within transfer and I know the lands therein described, on information.

2. I know the circumstances of the said transfer and the true consideration paid by me (us) (the Transferee(s)) is as follows: Cash

3. The current value* of the land**, in my opinion is $ 3,000,000.00

* "value" means the dollar amount that the land might be expected to realize if it were sold on open market by a willing seller to a willing buyer.

** "lands" includes buildings and all other improvements affixed to the land.

SWORN BEFORE ME _____
at the City of Calgary
in the Province of Alberta, this 30 day
of January, 2008.

_____
A Commissioner for Oaths
in and for the Province of Alberta

David J. Webber
Barrister & Solicitor
300, 1121 Centre St. N.
Calgary, Ab., T2E 7K6

John C Froese

Dated at the Town of Olds, in the Province of Alberta, on the 11th day of January, 2008

RICHARDSON BROS. (OLDS) LIMITED

TO

TRANSFER OF LAND

Martinson & Harder
Barristers & Solicitors
#1, 5401 - 49th Avenue

Olds, AB T4H 1G3

File No.: 24-453

081053277 REGISTERED 2008 02 08
TFLA - TRANSFER OF LAND
DOC 1 OF 1 DRR#: B010F0A ADR/CBERGIN
LINC/S: 0021269782 +

HISTORICAL LAND TITLE CERTIFICATE

TITLE CANCELLED ON FEBRUARY 08,2008

S

LINC	SHORT LEGAL	TITLE NUMBER
0021 269 774	5;1;33;3;SE	921 013 813 +1

LEGAL DESCRIPTION

MERIDIAN 5 RANGE 1 TOWNSHIP 33
SECTION 3
QUARTER SOUTH EAST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT

PLAN	NUMBER	HECTARES (MORE OR LESS)	ACRES
CONNECTING HIGHWAY	7027HX	1.20	2.97
ROADWAY	8110708	0.409	1.01
ROAD	8710934	0.005	0.01
SUBDIVISION	9210118	3.40	8.40

EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME

ESTATE: FEE SIMPLE

MUNICIPALITY: MOUNTAIN VIEW COUNTY

REFERENCE NUMBER: 881 236 107

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
921 013 813	21/01/1992	SUBDIVISION PLAN		

OWNERS

RICHARDSON BROS (OLDS) LIMITED.
OF BOX 309
OLDS
ALBERTA T0M 1P0

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
891 156 290	11/08/1989	UTILITY RIGHT OF WAY

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
		GRANTEE - FORTISALBERTA INC. 320 - 17 AVENUE S.W. CALGARY ALBERTA T2S2Y1 "PORTION AS DESCRIBED" (DATA UPDATED BY: TRANSFER OF UTILITY RIGHT OF WAY 001300201) (DATA UPDATED BY: CHANGE OF NAME 051022715)
921 013 814	21/01/1992	REQUEST FOR RELEASE OF D.C.T. DCT ISSUED SURRENDERED BY 081053277
001 300 201	20/10/2000	TRANSFER OF UTILITY RIGHT OF WAY 891156290 TRANSFEREE - UTILICORP NETWORKS CANADA (ALBERTA) LTD.
051 022 715	18/01/2005	CHANGE OF NAME RE: FORTISALBERTA INC. 320 - 17 AVENUE S.W. CALGARY ALBERTA T2S2Y1 AFFECTS INSTRUMENT: 891156290
061 030 140	19/01/2006	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - OLDS GOLF CLUB ASSOCIATION. C/O R.R. #1 SITE 2, BOX 13 OLDS ALBERTA T4H1P2 AGENT - VAL MCGEACHIE
081 053 277	08/02/2008	TRANSFER OF LAND OWNERS - ABE NEUFELD C/O STYLE REALTY INC BOX 35009, SARCEE POSTAL OUTLET CALGARY ALBERTA T3E7C7 AS TO 42.5% OWNERS - 1273927 ALBERTA LTD. C/O STYLE REALTY INC. PO BOX 35009 SARCEE POSTAL OUTLET CALGARY ALBERTA T3E7C7 AS TO 42.5% OWNERS - 404048 ALBERTA LTD. C/O STYLE REALTY INC. PO BOX 35009

(CONTINUED)

REGISTRATION
NUMBER DATE (D/M/Y) PARTICULARS

SARCEE POSTAL OUTLET
CALGARY
ALBERTA T3E7C7
AS TO 15%
NEW TITLE ISSUED

TOTAL INSTRUMENTS: 006

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 4 DAY OF JANUARY, 2024 AT 09:46 A.M.

ORDER NUMBER: 49248975

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER, SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

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LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0021 269 774	5;1;33;3;SE	081 053 277 +1

LEGAL DESCRIPTION

MERIDIAN 5 RANGE 1 TOWNSHIP 33
SECTION 3
QUARTER SOUTH EAST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT

PLAN	NUMBER	HECTARES (MORE OR LESS)	ACRES
CONNECTING HIGHWAY	7027HX	1.20	2.97
ROADWAY	8110708	0.409	1.01
ROAD	8710934	0.005	0.01
SUBDIVISION	9210118	3.40	8.40

EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME

ESTATE: FEE SIMPLE

MUNICIPALITY: MOUNTAIN VIEW COUNTY

REFERENCE NUMBER: 921 013 813 +1

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
081 053 277	08/02/2008	TRANSFER OF LAND		SEE INSTRUMENT

OWNERS

ABE NEUFELD
OF C/O STYLE REALTY INC
BOX 35009, SARCEE POSTAL OUTLET
CALGARY
ALBERTA T3E 7C7
AS TO AN UNDIVIDED 42.5% INTEREST

1273927 ALBERTA LTD.
OF C/O STYLE REALTY INC.
PO BOX 35009
SARCEE POSTAL OUTLET
CALGARY
ALBERTA T3E 7C7

(CONTINUED)

AS TO AN UNDIVIDED 42.5% INTEREST

404048 ALBERTA LTD.
OF C/O STYLE REALTY INC.
PO BOX 35009
SARCEE POSTAL OUTLET
CALGARY
ALBERTA T3E 7C7
AS TO AN UNDIVIDED 15% INTEREST

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
891 156 290	11/08/1989	UTILITY RIGHT OF WAY GRANTEE - FORTISALBERTA INC. 320 - 17 AVENUE S.W. CALGARY ALBERTA T2S2Y1 "PORTION AS DESCRIBED" (DATA UPDATED BY: TRANSFER OF UTILITY RIGHT OF WAY 001300201) (DATA UPDATED BY: CHANGE OF NAME 051022715)
061 030 140	19/01/2006	CAVEAT RE : RIGHT OF WAY AGREEMENT CAVEATOR - OLDS GOLF CLUB ASSOCIATION. C/O R.R. #1 SITE 2, BOX 13 OLDS ALBERTA T4H1P2 AGENT - VAL MCGEACHIE
101 101 284	09/04/2010	CAVEAT RE : AMENDING AGREEMENT CAVEATOR - OLDS GOLF CLUB ASSOCIATION. C/O R.R. #1 SITE 2, BOX 13 OLDS ALBERTA T4H1P2 AGENT - JAMES L MACINNES

TOTAL INSTRUMENTS: 003

(CONTINUED)

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 4 DAY OF JANUARY, 2024 AT 09:46 A.M.

ORDER NUMBER: 49248975

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER, SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION, APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).

APPENDIX E2

Land Titles –

Survey

Bifröst

Environmental and Remediation Services Inc.

Alberta This plan may not be commercially re-distributed, transferred or manipulated in any form without the specific written consent of Alberta Land Titles

PLAN

Showing Survey Of

HIGHWAY CONNECTING OLDS NO. 2 Hwy.

Through

TWP. 32 & TWP. 33 RGE. 1 W 5 M.

SCALE: 1 inch = 300 feet Surveyed by P. Baptie ALS

1956.

File No. 40549

7027 H.X.

V-7934

OLDS

SW ¼ Sec. 4-33-1-5. Area required 3.01 acres. 109Z120

SE ¼ Sec. 4-33-1-5. Area required 2.61 acres. 109Z119

SW ¼ Sec. 3-33-1-5. Area required 109Z114

SE ¼ Sec. 3-33-1-5. Area required 2.87 acres.

SW ¼ Sec. 2-33-1-5. Area required 3.08 acres. 109Z112

SE ¼ Sec. 2-33-1-5. Area required 2.61 acres. 109Z111

NW ¼ Sec. 33-32-1-5. Area required 2.53 acres. 55Y179

NE ¼ Sec. 33-32-1-5. Area required 2.43 acres. 55Y180

NW ¼ Sec. 34-32-1-5. Area required 2.31 acres. 74H71

NE ¼ Sec. 34-32-1-5. Area required 2.82 acres. 61L179

NW ¼ Sec. 35-32-1-5. Area required 2.61 acres. 72Y47

NE ¼ Sec. 35-32-1-5. Area required 2.70 acres. 68V239

Clover leaf 3470 M

HIGHWAY

Hwy. 7752

Hwy. 1401 M

Hwy. 7730

No. 2nd

PLAN

SHOWING SURVEY OF

TELEPHONE RIGHT OF WAY

IN

SECS. 2, 3 & 4 TWP 33 RGE 1 W5 TH

Scale 1 in = 6 chs. 1941 C.W. Lester, A.L.S.

File: 38336

2360EZ

I, C.W. Lester, of the City of Edmonton in the Province of Alberta, Dominion Lands Surveyor, do hereby certify that this plan correctly shows the traverse to which the lands shown hereon have been surveyed by me, that such survey has been made by me personally according to the instructions of the Surveyor General of The Public Works and that the measurements and data in this plan of the traverse are true to the best of my knowledge and belief.

I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of The Canada Evidence Act.

Declared before me at Edmonton in the Province of Alberta this 21st day of March 1942

C.W. Lester
Dominion Lands Surveyor.

R. Kirkland
A Commissioner etc.

I hereby certify that this plan is a true copy of the returns of survey of the road shown hereon that such survey and plan have been made in accordance with the provisions of The Public Works Act and that I have examined and approved the said returns and one copy thereof is filed in the Department of Public Works for the Province of Alberta and that one copy has been filed in the Land Titles Office for the land registration district of South Alberta in possession of the said road.

Issued at Edmonton, this 24th day of March 1942

J.H. Ridley
Acting Chief Engineer and Deputy Minister of Public Works for the Province of Alberta.

Ord 26.3.42 N.C.

May 2 1942 2360 E.Z. 1340EZ

0-36 acs

S.W. ¼ SEC. 4 - 33 - 1 - 5

Area required 0.50 acs.

Cert of Title 1913 E.E. 0.47 acs

S.E. ¼ SEC. 4 - 33 - 1 - 5

Area required 0.50 acs.

S.W. ¼ SEC. 3 - 33 - 1 - 5

Area required 0.50 acs.

57 N 28

S.E. ¼ SEC. 3 - 33 - 1 - 5

Area required 0.50 acs.

S.W. ¼ SEC. 2 - 33 - 1 - 5

Area required 0.50 acs.

S.E. ¼ SEC. 2 - 33 - 1 - 5

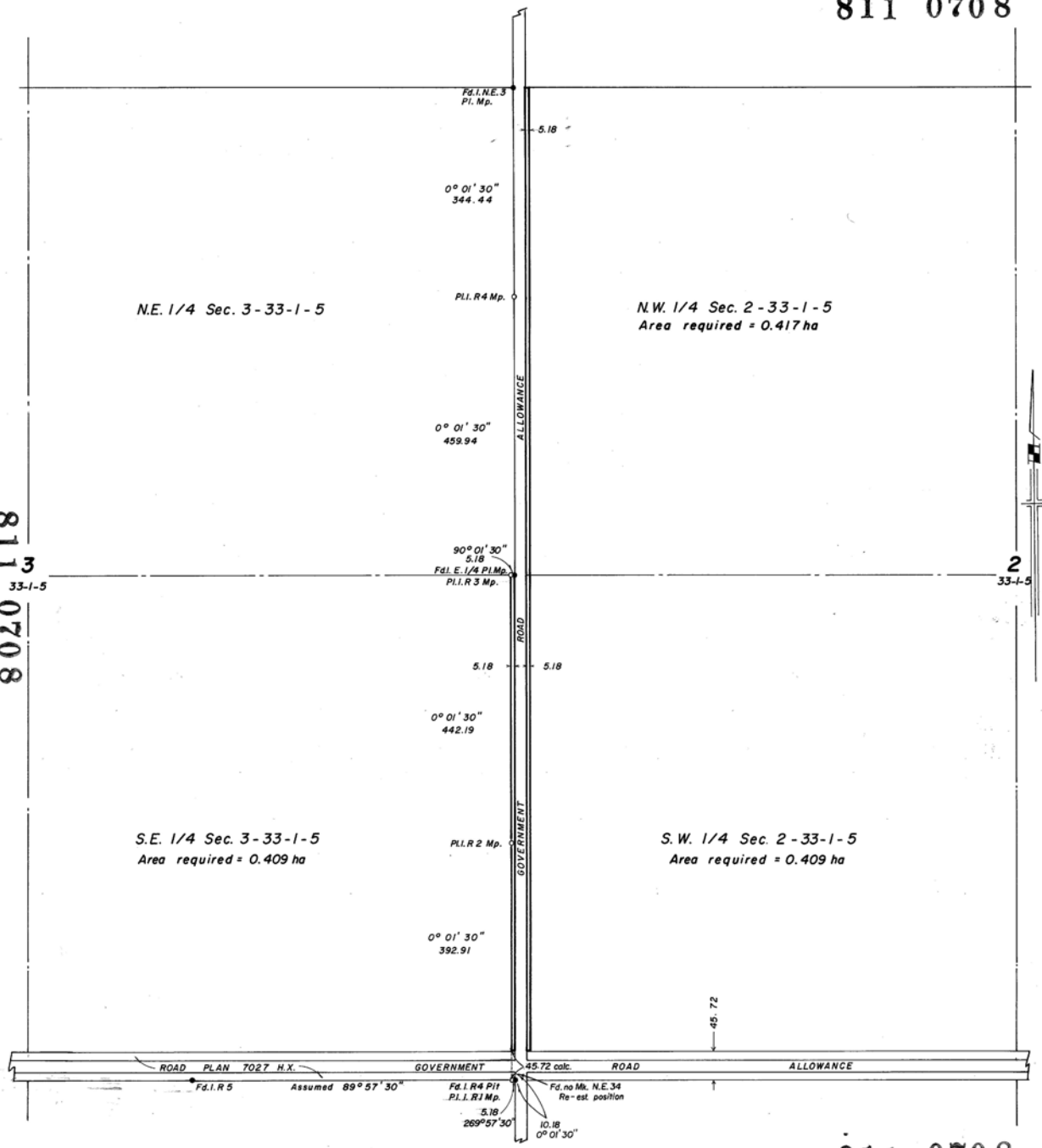
Area required 0.47 acs.

658.177

NW 33-32-1-5

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811 0708



811 0708

16486 M.D. 80 20 118

DIRECTOR OF SURVEYS	REGISTRAR, SOUTH ALBERTA LAND REGISTRATION DISTRICT	PLAN NUMBER 811 0708

SURVEY APPROVED
DIRECTOR OF SURVEYS
DATE APPROVED 81-05-22
EX'D JI FILE 16486 M.D.
81/05/21
APPROVAL VALID FOR TWELVE MONTHS

FILE: 424-MD-80

PLAN NUMBER 8110708 IS HEREBY CERTIFIED AS DULY ENTERED AND REGISTERED IN THE LAND TITLES OFFICE FOR THE SOUTH ALBERTA LAND REGISTRATION DISTRICT.
JUN 15 1981
A.D. REGISTRAR

SOUTH ALBERTA LAND REGISTRATION DISTRICT LAND TITLES OFFICE

I, J. MARIE SATRA, OF THE CITY OF EDMONTON, ALBERTA LAND SURVEYOR, MAKE OATH AND SAY:
1. THAT THE SURVEY REPRESENTED BY THIS PLAN WAS MADE UNDER MY PERSONAL SUPERVISION,
2. THAT THE SURVEY WAS MADE IN ACCORDANCE WITH GOOD SURVEYING PRACTICES AND IN ACCORDANCE WITH THE PROVISIONS OF THE SURVEYS ACT, AND
3. THAT THE SURVEY WAS PERFORMED BETWEEN THE DATES OF OCT. 22 AND NOV. 4, 1980, AND THAT THIS PLAN IS TRUE AND CORRECT AND IS PREPARED IN ACCORDANCE WITH THE PROVISIONS OF THE LAND TITLES ACT.

SWORN BEFORE ME AT THE CITY OF EDMONTON, IN THE PROVINCE OF ALBERTA, THIS 13 DAY OF NOV., 1980

ALBERTA LAND SURVEYOR

A COMMISSIONER FOR OATHS IN AND FOR THE PROVINCE OF ALBERTA. J.B. STEWART

LEGEND
STATUTORY SURVEY MONUMENTS FOUND SHOWN THUS: •
STATUTORY IRON POSTS PLANTED SHOWN THUS: ○
DISTANCES ARE IN METRES AND DECIMALS THEREOF.
LANDS DEALT WITH BY THIS PLAN BOUNDED THUS: ——
Mp. STANDS FOR MARKER POST.

UNDER SECTION 134 OF THE MUNICIPAL GOVERNMENT ACT
CANADA) I, F.J. DAWLEY
PROVINCE OF ALBERTA) OF DIDSBURY, ALBERTA
TO WIT) MAKE OATH AND SAY:
1. THAT I AM THE COUNTY COMMISSIONER OF THE COUNTY OF MOUNTAIN VIEW NO. 17.
2. THAT AGREEMENTS HAVE BEEN REACHED WITH ALL THE OWNERS OF THE LANDS AFFECTED BY THIS PLAN AS TO TO THE AREA TO BE ACQUIRED AND THE PRICE TO BE PAID.
3. THAT THE LAND TO BE ACQUIRED IS FOR THE PURPOSE OF PUBLIC ROAD.

SWORN BEFORE ME AT THE TOWN OF DIDSBURY IN THE PROVINCE OF ALBERTA THIS 23 DAY OF DECEMBER, 1980

COUNTY COMMISSIONER

A COMMISSIONER FOR OATHS IN AND FOR THE PROVINCE OF ALBERTA.

I HEREBY CERTIFY THAT THE SURVEY REPRESENTED BY THIS PLAN HAS BEEN MADE IN ACCORDANCE WITH THE INSTRUCTIONS OF THE COUNCIL OF THE COUNTY OF MOUNTAIN VIEW NO. 17 UNDER THE PROVISIONS OF THE MUNICIPAL GOVERNMENT ACT.

COUNTY COMMISSIONER "SEAL"

COUNTY OF MOUNTAIN VIEW NO. 17

PLAN
SHOWING SURVEY OF
ROAD WIDENING
IN
W. 1/2 SEC. 2 - TP. 33 - R.1 - W.5M.
AND
S.E. 1/4 SEC. 3 - TP. 33 - R.1 - W.5M.
1980

SCALE 1 : 5000

J.M. SATRA, A.L.S.

0 100 200 300 metres

FILE No. 80-9786 | A. A.M.M. | B.

Stewart · Weir · Stewart
Watson Heinrichs · Dixon

PLAN NUMBER

Nov 17/80

16486 M.D. 811 0708 5 32 33

88-04-134

Dr/88 Ref

Alberta This plan may not be commercially re-distributed, transferred or manipulated in any form without the specific written consent of Alberta Land Titles

120447

8710934

PLAN SHOWING SURVEY of PUBLIC WORK (ROAD)

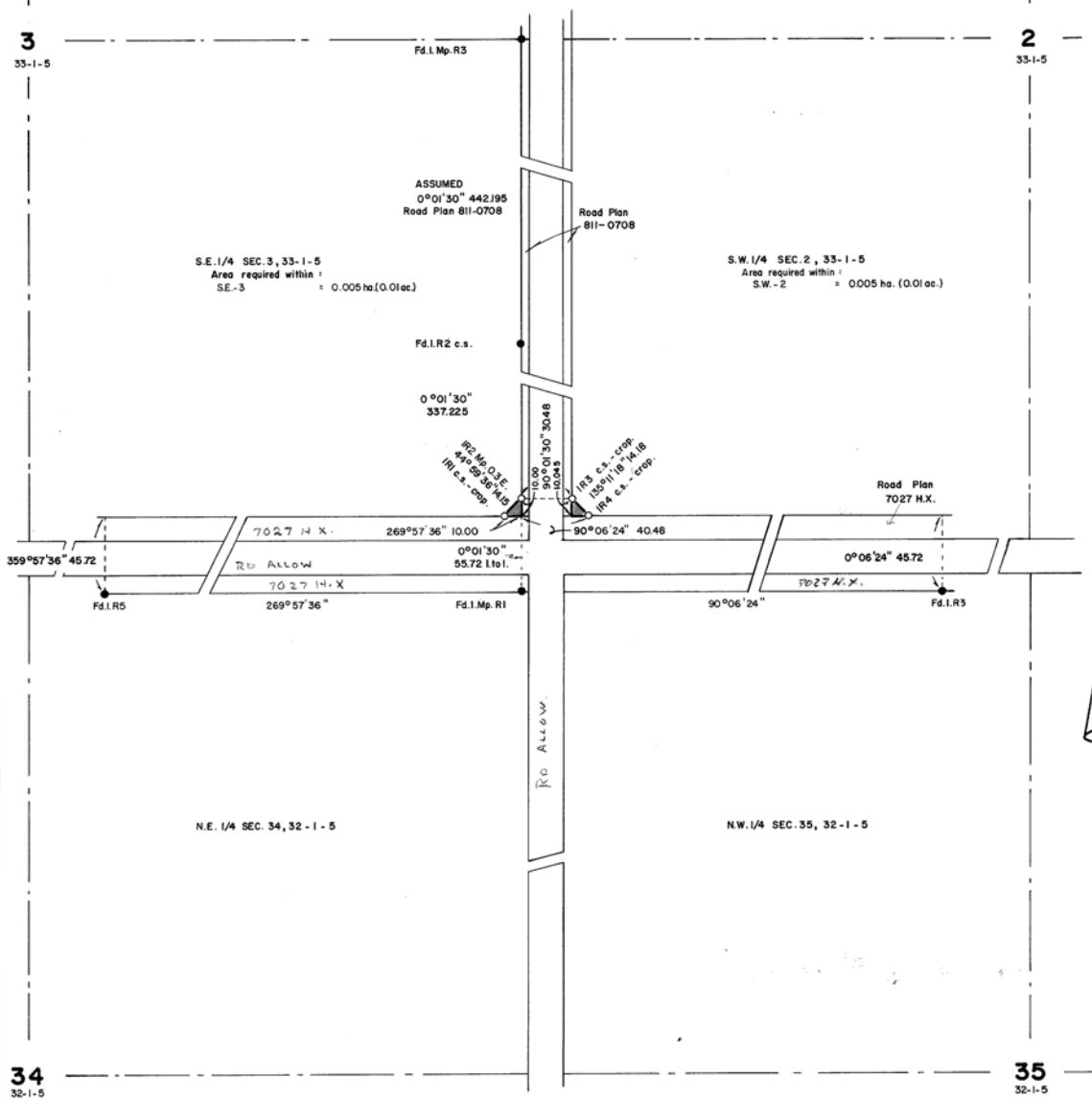
IN

S.W.1/4 SEC. 2, TWP. 33, RGE. 1, W.5M.
S.E.1/4 SEC. 3, TWP. 33, RGE. 1, W.5M.

SCALE : 1:2000 1986 G.R. MOORE, A.L.S.

SURVEY APPROVED
DIRECTOR OF SURVEYS
DATE APPROVED 87-06-05
EXD. MCR FILE 120447
APPROVAL VALID FOR TWELVE MONTHS.

P



0 50 100 150 metres.

LEGEND:

Statutory iron posts found shown thus ———●
Statutory iron posts placed and marked 301 shown thus ———○
"Mp." Stands for marker post placed as indicated.
"Pl." Stands for placed.
"c.s." Stands for countersunk.
Distances are in metres and decimals thereof.
Area to be registered inlined or shaded in red.

I, G.R. Moore of the City of Red Deer, Alberta Land Surveyor, make oath and say:

1. That the survey represented by this plan was made under my personal supervision,
2. That the survey was made in accordance with good surveying practices and in accordance with the provisions of the Surveys Act, and
3. That the survey was performed July 15th. 1986, and that this plan is true and correct, and is prepared in accordance with the provisions of the Land Titles Act.

Sworn before me at the City of Red Deer, in the Province of Alberta this 17th day of March 1987.

G.R. Moore
Alberta Land Surveyor

R.A. Bollinger
R.A. Bollinger 13-07-87
A Commissioner For Oaths in and for the Province of Alberta.

I hereby certify that this plan represents a survey of land required for a public work pursuant to the Public Works Act and that the land covered by this plan was acquired by agreement with the owners thereof.

Dated 17th June 1987

Director of Property Services.

8710934

SOUTH ALBERTA LAND REGISTRATION DISTRICT LAND TITLES OFFICE

JUL 13 1987

I certify that the within instrument is duly Entered and Registered in the Land Titles Office for the South Alberta Land Registration District at Calgary.

Registrar
SALRD

871120091

File : 27-MH-84 Plan No. 1
Property Service Branch.
Alberta Transportation.

R.A.B.

5
12
79
50
56.

582-83

Alberta This plan may not be commercially re-distributed, transferred or manipulated in any form without the specific written consent of Alberta Land Titles

121643

8910798

DIRECTOR OF SURVEYS

SURVEY APPROVED
for DIRECTOR OF SURVEYS
DATE APPROVED 89-06-22
EXD. O.S. FILE 121643
APPROVAL VALID FOR TWELVE MONTHS.

LAND TITLES OFFICE

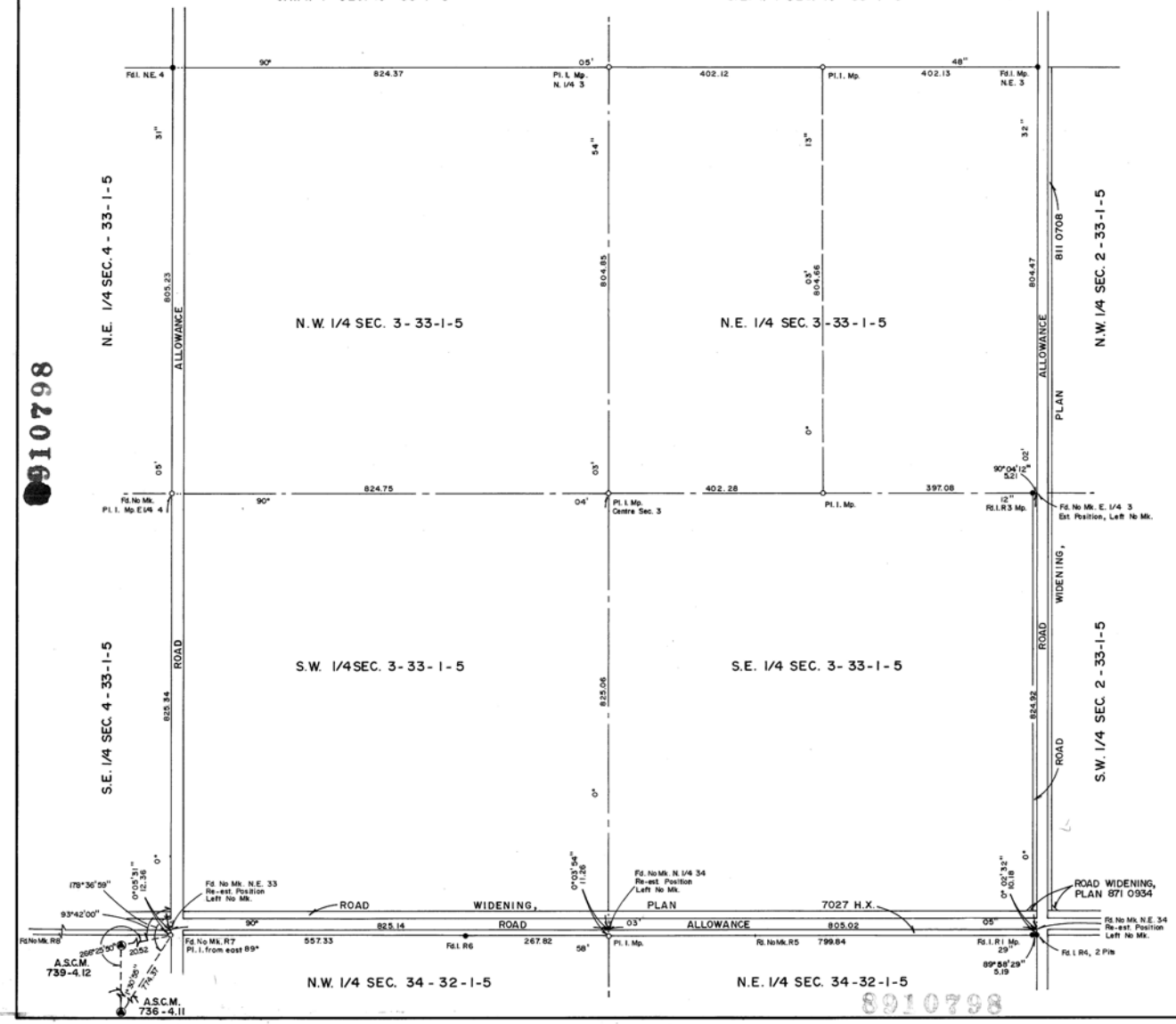
8910798

I certify that the within instrument is duly entered in the Register of the Land Titles Office for the South Alberta Land Registration District at Calgary.

A.D. Registrar
SALRD

JUL 14 1989

891110142



COUNTY OF MOUNTAIN VIEW No. 17

PLAN SHOWING

MONUMENT SURVEY

AFFECTING

SEC. 3, TWP. 33, RGE. 1, W. 5 M.

SCALE: 1:5000 0 50 100 200 300 400 500 METRES

BY: D. L. TRONNES, A.L.S., 1988

LEGEND:

Distances shown are in metres and decimals thereof.
Statutory Iron Posts are shown thus; ● found, ○ planted and marked 'P 078'.
Alberta Survey Control Monuments shown thus; ⊕
Bearings are Grid and derived from a line joining A.S.C.M.'s 739-4.12 & 736-4.11

SURVEYORS AFFIDAVIT:

I, DARRYL L. TRONNES, of the City of Calgary, Alberta Land Surveyor, make oath and say:
1. that the survey represented by this plan was made under my personal supervision,
2. that the survey was made in accordance with good surveying practices and in accordance with the provisions of The Surveys Act,
3. that the survey was performed on the dates of December 7th and December 8th, 1988, and that this plan is true and correct and is prepared in accordance with the provisions of The Land Titles Act.

Sworn before me at the City of Calgary in the Province of Alberta this 20 th. day of December, 1988.

KARIM LADHA JUMA (Expires May 14th, 1989)
A Commissioner for Oaths in and for the Province of Alberta.

Alberta Land Surveyor

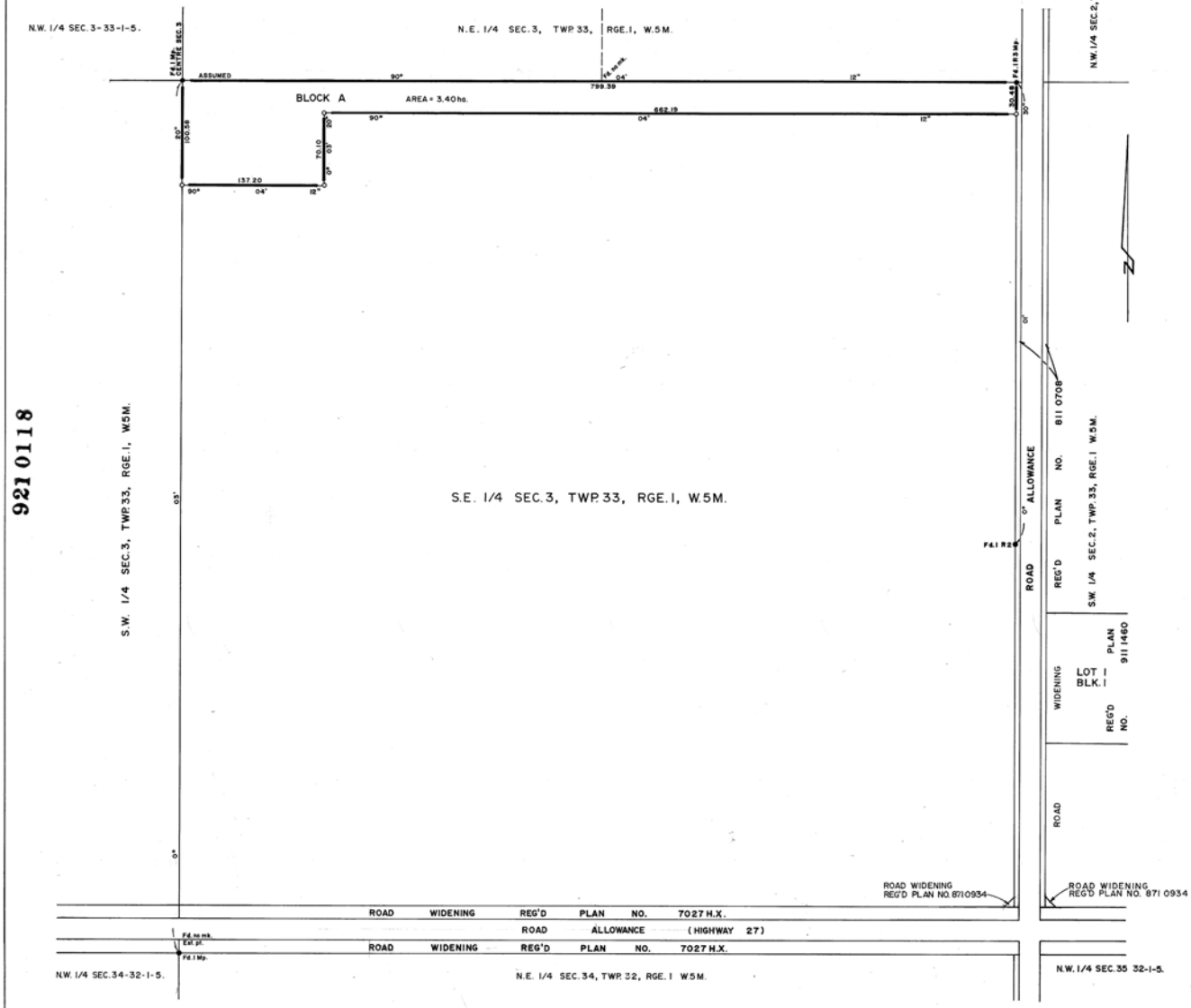
ALBERTA LAND SURVEYORS' ASSOCIATION PERMIT NUMBER P 078 TRONNES SURVEYS (1976) LTD.

TRONNES SURVEYS (1976) LTD. 1002 Edmonton Trail N.E., Calgary, Alberta T2E 3K2, Tel. 230-9040, File 88-0070

8910798

This plan may not be commercially re-distributed, transferred or manipulated in any form without the specific written consent of Alberta Land Titles

9210118



PLANNING

APPROVED
JAN 0 3 1992
THE COUNTY OF MOUNTAIN VIEW NO. 17
Sec'y.

Reserves not required pursuant to section 97 of the Planning Act
The County of Mountain View No. 17.

LAND TITLES

9210118

I certify that the within instrument is duly Entered and Registered in the Land Titles Office for the South Alberta Land Registration District at Calgary.

A.R. Registrar

JAN. 21/1992
9210138 13

SOUTH ALBERTA LAND REGISTRATION DISTRICT LAND TITLES OFFICE

COUNTY OF MOUNTAIN VIEW NO. 17

PLAN SHOWING
SUBDIVISION
OF PART OF THE
SE1/4 SEC. 3, TWP.33, RGE.1, W5M
SCALE = 1:2000
R.M. POLLOCK, ALS
1991

0 10 20 30 50 100 150 200 250
METRES

NOTE:

ALL LINEAR MEASUREMENTS ARE IN METRES AND DECIMALS THEREOF.
AREA REGISTERED BY THIS PLAN SHOWN OUTLINED THUS _____
AND CONTAINS 1 BLOCK AND 3.40 ha.
STATUTORY IRON POST FOUND SHOWN THUS ●
STATUTORY IRON POST PLANTED SHOWN THUS ○
STATUTORY IRON POSTS PLANTED ARE MARKED 266

I, ROBERT M. POLLOCK OF THE TOWN OF OLDS, IN THE PROVINCE OF ALBERTA, ALBERTA LAND SURVEYOR, MAKE OATH AND SAY:

1. THAT THE SURVEY REPRESENTED BY THIS PLAN WAS MADE UNDER MY PERSONAL SUPERVISION.
2. THAT THE SURVEY WAS MADE IN ACCORDANCE WITH GOOD SURVEYING PRACTICES AND IN ACCORDANCE WITH THE PROVISIONS OF THE SURVEYS ACT, AND
3. THAT THE SURVEY WAS PERFORMED BETWEEN THE DATES OF SEPTEMBER 24 AND OCTOBER 3, 1991 AND THAT THIS PLAN IS TRUE AND CORRECT, AND IS PREPARED IN ACCORDANCE WITH THE PROVISIONS OF THE LAND TITLES ACT.

Robert M. Pollock
ALBERTA LAND SURVEYOR

SWORN BEFORE ME AT THE TOWN OF OLDS, IN THE PROVINCE OF ALBERTA THIS 16 DAY OF OCTOBER, 1991

Donald V. Lowry
A COMMISSIONER FOR OATHS IN AND FOR THE PROVINCE OF ALBERTA
DONALD V. LOWRY
MY COMMISSION EXPIRES ON THE 2nd DAY OF MAY, 1992

RICHARDSON BROS. (OLDS) LTD.

(SEAL)

ROBERT M. POLLOCK ALS
BOX 2259, OLDS, AB.
T0M 1P0
9 084-90

9210118

9210118

APPENDIX F

Company Records

Bifröst

Environmental and Remediation Services Inc.

APPENDIX F1

Macintosh –

Geotechnical Report

Bifröst

Environmental and Remediation Services Inc.

McINTOSH • LALANI ENGINEERING LTD.

GEOTECHNICAL EVALUATION
MOUNTAIN VIEW MEADOWS BUSINESS PARK AND RESIDENTIAL COMMUNITY
MOUNTAIN VIEW COUNTY- ALBERTA

April, 2008

M•L 3899

GEOTECHNICAL EVALUATION
MOUNTAIN VIEW MEADOWS BUSINESS PARK AND RESIDENTIAL COMMUNITY
MOUNTAIN VIEW COUNTY, ALBERTA

SUBMITTED TO:

MMM Group Limited
Calgary, Alberta

PREPARED BY:

McIntosh•Lalani Engineering Ltd.
Calgary, Alberta

April, 2008

M•L 3899

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5.0	SURFICIAL GEOLOGY AND GROUNDWATER CONDITIONS	2
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	6.5 Weeping Tile Subdrains	6
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1.0 INTRODUCTION

This report presents the results of a geotechnical evaluation conducted by McIntosh•Lalani Engineering Ltd. (M•L) for the proposed Mountain View Meadows development in Mountain View County, Alberta. This evaluation was undertaken at the request of Mr. John Berry, P.Eng. of MMM Group Ltd. The objective of this evaluation was to assess the general subsurface soil conditions within the site and provide geotechnical construction guidelines for the development. The scope of work is summarized as follows:

- Drill thirty five (35) boreholes to a depth of 9 metres on an approximate 250 m grid and install PVC standpipes in each to allow future monitoring of groundwater conditions across the site.
- Drill six (6) boreholes to a depth of up to 3.0 metres across the two S.E. quarters for assement of the suitability of the site for weeping tile fields.
- Measure groundwater elevations in the monitoring wells, approximately 1 week after drilling.
- Undertake laboratory testing, as necessary, to aid in determining the geotechnical engineering properties of the soils.
- Prepare a geotechnical evaluation report providing the findings of the site investigation, analysis and geotechnical recommendations for the design and construction of the development.

The following sections present our understanding of the project and the results and recommendations of the geotechnical investigation.

2.0 PROJECT DETAILS

It is our understanding that the project is composed of the development of approximately four contiguous quarter sections of land immediately northwest of Highway 2 and Highway 27, east of Olds, Alberta, into a business park and residential community. Based on conceptual drawings supplied by MMM group, the land is understood to be partitioned into approximately 500 residential lots and 190 acres of commercial and light industrial lots,

As such, development of the land is understood to involve stripping and grading of the site and construction of the underground utilities and roadways. This report serves to present the results of the field drilling program, laboratory testing and recommendations with regard to the above noted construction issues.

3.0 SITE DESCRIPTION AND TOPOGRAPHY

The subject lands are composed of portions of Sections 2 and 3, Township 33, Range 1, west of the 5th meridian, which lie immediately to the northwest of Highways 2 and 27.

The lands are presently utilized for mainly agricultural and grazing purposes, with several acreage style houses. Topographically, the lands are flat to rolling, with little overall vertical relief and several small potholes and sloughs.

4.0 FIELD AND LABORATORY WORK

The fieldwork consisted of drilling forty one (41) subsurface investigation boreholes from February 15 to February 25, 2008, using a solid stem auger drill rig contracted from Beck Drilling & Environmental Services Inc. of Calgary. Standard Penetration Testing (SPT) and Pocket Penetrometer measurements were taken at select depths in the boreholes to aid in classifying the soil strengths and disturbed soil samples were collected for laboratory testing Slotted PVC standpipes were installed in all boreholes to allow for future monitoring of groundwater levels.

The boreholes were drilled on an approximate 250 m grid spaced more or less evenly across the lands. The borehole locations were surveyed and marked prior to drilling by MMM Group Ltd, on the grid pattern noted above. It should be noted, however, that BH's 36 to 41, representing the percolation field testholes, were not drilled in their surveyed locations. The approximate location of the boreholes are shown on the attached Figure No. 1, and the borehole logs are presented in Appendix A.

The laboratory test program included natural moisture contents, soluble sulphate concentrations, Atterberg Limits and grain size distribution determination on select soil samples. The result of these tests are discussed throughout the text of this report and are shown on the attached borehole logs.

5.0 SURFICIAL GEOLOGY AND GROUNDWATER CONDITIONS

5.1 Soils

The general subsurface soil stratigraphy of the site consists of surficial organic topsoils overlying glacial till soils atop sedimentary bedrock. In addition, shallow deposits of sandy sediments were encountered in several boreholes, which may be a relic of historic wetland or sloughy areas.

Organic topsoil was encountered in all forty one boreholes, ranging in thickness from 75 mm to 405 mm. The average depth of organic topsoil encountered during drilling was approximately 165 mm. Only negligible depths of organic browns were encountered, and the topsoil was composed almost entirely of black loam, which is typical for tilled fields. Organic browns may be encountered in the undisturbed treed areas of the northern quarter.

Underlying the topsoil, glacial tills composed of silts and silty clays were encountered in the majority of the boreholes. In six of the forty one boreholes, silt and sand deposits were encountered beneath the topsoil, which may either be a glacial deposit or possibly sediments from historic wetland or slough areas. Where encountered, the sandy sediments were described as compact and dry to damp, and typically extended to a depth of 1.5 m to 2.5 m below existing grade.

Underlying these sandy deposits, or directly underlying the topsoil, glacial till was typically encountered. The till was generally composed of a compact and dry to damp silt at the surface, underlain by a silty clay till. The silt till extended to a depth of 1 to 2 metres below existing grade, although in many cases the silt material was absent and the silty clay till was encountered directly underlying the topsoil. The silty clay till was stiff in consistency, being damp and medium plastic with traces of sand and gravel throughout. Lenses and pockets of sand and silt were also encountered throughout the silty clay till body. The glacial material extended to either sedimentary bedrock or beyond the depth of drilling in all boreholes.

Sedimentary bedrock was encountered in only four boreholes, at depths ranging from 7 to 8 metres below existing grade. In addition, bedrock was encountered at a depth of only 3 metres below grade in BH-3, which may represent a piece of rafted sandstone or boulder. Auger refusal was met, and the exact nature of the shallow bedrock in this area was not determined. Where encountered, the bedrock was composed of hard sandstone and siltstone.

A more detailed soil description of each borehole is presented in the borehole logs in Appendix A.

At the time this report was prepared, information regarding the subsurface stratigraphy was available only at discrete borehole locations. Conditions were extrapolated and interpolated from the borehole locations to develop the following recommendations. Adequate monitoring should be provided during construction to confirm that these assumptions are reasonable. If conditions are encountered during construction that do not agree with the borehole information, M•L should be allowed to revise our recommendations.

5.2 Groundwater

Groundwater seepage was only encountered during drilling in one of the forty one boreholes, BH-23, in a deep sand lense encountered at a depth of 8.7 m below grade. The remainder of the boreholes were largely dry upon completion.

Groundwater measurements were taken on March 7, 2008, at which point the groundwater depth ranged from 2.9 m below grade to dry to a depth of 9.1 m below grade. This corresponds to a groundwater elevation ranging from 1015.1 m to 1006.2 m ASL.

The groundwater measurements are presented on Table No. 1, attached.

6.0 DISCUSSION AND RECOMMENDATIONS

Design recommendations presented in this report are based on the assumption that an adequate level of inspection will be provided during construction and that construction will be carried out by a suitably qualified contractor, experienced in underground utility installation and earthworks. An adequate level of inspection is considered to be:

- for earthworks - full time monitoring and compaction testing.
- for underground utility installation and backfilling - full time monitoring and compaction testing.
- for foundation bearing inspections - inspection by qualified geotechnical engineering personnel.

Inspection should be carried out by suitably qualified persons, independent of the contractor. The purpose of providing an adequate level of inspection is to check that recommendations, based on the data obtained at discrete borehole, are relevant to other areas of the site.

6.1 Construction Excavation and Temporary Dewatering

The composition and consistency of the site soils are such that conventional hydraulic excavators should be suitable to remove the majority of the site soils. Relatively shallow bedrock was encountered in some boreholes, at depths as shallow as 3 m in BH-3. This may represent a piece of rafted bedrock or an isolated boulder; however, if encountered during deep utility construction it may pose difficulties. Use of rippers or pneumatic chipping tolls may be required in such an instance.

All excavations should have no more than 1.5 m of vertical wall before backsloping at a maximum gradient of 1H:1V is required. Deeper excavations encountering the sand or silt seams may require additional backsloping or shoring if excessive seepage is noted during construction. Excavations should be inspected by a geotechnical engineer if such conditions are encountered during utility construction.

Due to the shallow groundwater encountered in areas of the site, excavations may encounter groundwater infiltration and require dewatering. The volume of seepage is anticipated to be relatively limited, and sumps equipped with submersible pumps would be considered a feasible method of dewatering in these instances.

6.2 Site Grading

Some cuts and fills may be required within the proposed development. All organic topsoil and vegetation should be removed from areas to be filled. The backfill should be placed in uniform lifts compacted to a minimum of 98 percent of Standard Proctor Density at a moisture content in the range of optimum to 3 percent above optimum. For the most part, conventional methods of site grading using scrapers are considered to be feasible on this site.

The building footprint of large commercial or light industrial facilities may include most, if not all, of the available lot space. Therefore, we recommend that the entire lot be treated as a building envelope. Alternatively, the commercial lots should be left ungraded.

6.3 Pipe Support

Over the majority of the site, we do not anticipate any difficulties with regard to the pipe support. Conventional methods for pipe support are considered feasible.

Clay plugs should be used around utilities founded in predominately silt or sand soils. The frequency and locations of plugs should be determined once utility and site grades have been finalized.

6.4 Foundations

Based on the results of the geotechnical investigation, conventional shallow foundations in conjunction with slabs-on-grade are considered feasible for residential structures.

All foundations placed on fill soils should be protected by installation of weeping tile subdrains around all footings. This should include the rear frost wall of any walkout units. In addition, all backfill placed around foundation walls should be properly moisture conditioned and compacted to a minimum of 95 percent Standard Proctor Density.

We recommend that residential footings be designed for a soil bearing capacity of 100 kPa. Bearing certificates should be prepared for all footings placed on fill by qualified geotechnical engineering personnel.

Footings within heated structures should be founded at a depth of 1.4 m below grade and for unheated structures at a depth of 2.1 metres grade to protect against the effects of frost heaving.

Both conventional shallow strip and spread footing and deep pile foundation systems are considered feasible for commercial or industrial buildings in the area. However, due to the wide variance in potential building types, sizes and loads, we recommend that independent geotechnical investigations be performed for each lot by the owner prior to construction.

6.5 Weeping Tile Fields

Six additional boreholes (BH's 36 to 41) were advanced across the middle of the Phase 1 area, which is comprised of the south half of Section 2. The final location and layout of the weeping tile fields has not yet been determined, therefore, these boreholes are only intended to give a general idea of the suitability of the site for weeping tile fields.

Soil conditions in the six boreholes noted above consisted of the surficial organic topsoils overlying 1 to 2 metres of silt till atop silty clay glacial till. Groundwater was not encountered during drilling, or within 3 m of the surface during subsequent monitoring.

Soil Index Properties

Hydrometer Testing (BH's 36-4)

	Maximum	Minimum	Average
Clay Fraction	27 %	13 %	17.6 %
Silt Fraction	51 %	40 %	45.8 %
Sand Fraction	47 %	31 %	36.5 %

Atterberg Limit Testing (Across Whole Site)

	Maximum	Minimum	Average
Plastic Limit	13.3	10.1	10.5
Liquid Limit	39.0	25.5	36.2
Plasticity Index	26.7	13.6	24.4

Based on these tests, on average, the site soils consist of a low to medium plastic sandy silt with some clay, with a wide variation in sand content. Given these results, the site soils appearsuitable for construction of weeping tile fields. Percolation testing should be conducted across the site during the late spring or summer, once the field layouts have been determined to confirm these results.

6.6 Concrete Type

Laboratory testing of select soil samples has shown the concentration of water soluble sulphates to be up to 1.1 percent. Therefore, all concrete elements in contact with the site soils should be designed for a S-2 exposure class.

7.0 DESIGN AND CONSTRUCTION GUIDELINES

Recommended general design and construction guidelines are provided in Appendix B, under the following headings:

- Backfill Materials and Compaction
- Construction Excavations
- Shallow Foundations

These guidelines are intended to present standards of good practice. Although supplemental to the main text of this report, they should be interpreted as part of the report. Design recommendations presented herein are based on the premise that these guidelines will be followed. The design and construction guidelines are not intended to present detailed specifications for the work, although they prove useful in the preparation of such specifications. In the event of any discrepancy between the main text of this report and Appendix B, the main text should govern.

8.0 LIMITATIONS

Recommendations presented herein are based on a geotechnical evaluation of the findings in forty one (41) boreholes. The conditions encountered during the fieldwork are considered to be reasonably representative of the site. If, however, conditions other than those reported are noted during subsequent phases of the project, M•L should be given the opportunity to review our current recommendations in light of new findings.

This report has been prepared for the exclusive use of MMM Group Ltd. and their agents for specific application to the development described in this report. It has been prepared in accordance with generally accepted soil and foundation engineering practices. No warranty is expressed or implied.

9.0 CLOSURE

We trust information presented herein meets with your present requirements. If you have questions or require additional geotechnical services please contact our office.

McIntosh•Lalani Engineering Ltd.

Lee Martin, E.I.T.

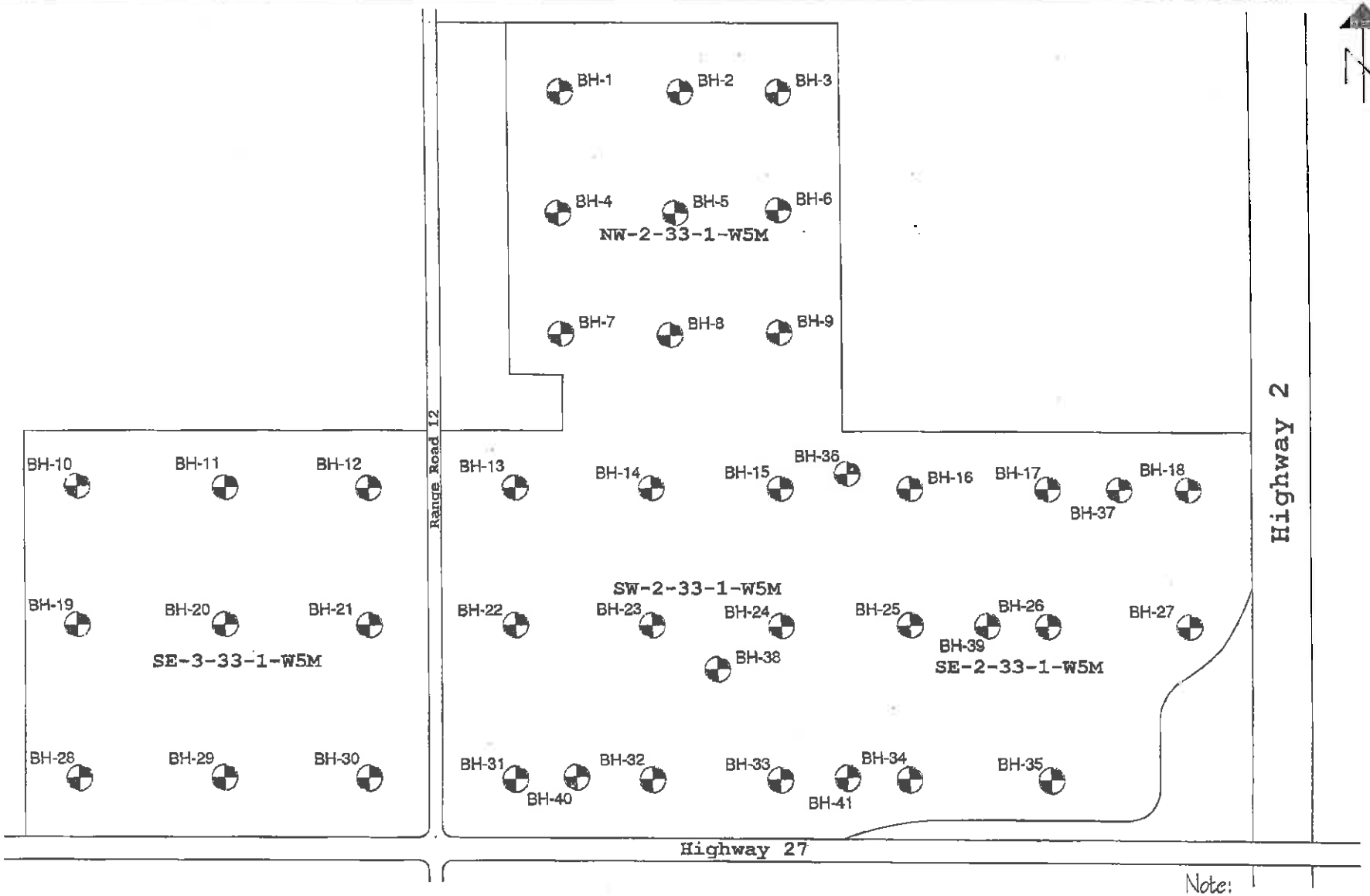
/clc

A.W. McIntosh, P.Eng.
Senior Project Engineer

PERMIT TO PRACTICE
McINTOSH LALANI ENGINEERING LTD.
Signature
Date April 28/08
PERMIT NUMBER: P 6482
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

LIST of FIGURES

LIST of FIGURES



Client: MMM GROUP	McIntosh Lalani Engineering Ltd.		
Project: OLDS MOUNTAIN VIEW SUBDIVISION			
Title: BOREHOLE LOCATIONS	Scale: N.T.S	Date: 26 FEBRUARY 2008	Job#: ML-3899	Figure: FIGURE No. 1

TABLES

Mclntosh Lalani

GROUNDWATER SUMMARY SHEET

CLIENT MMM Group

PROJECT NAME Olds Mountain View Subdivision

PROJECT NUMBER 3899

DATE 4/14/2008

Borehole	Surface Elevation	Date of Reading	Depth to Groundwater	Groundwater Elevation
1	1017.16	3/7/2008	7.05	1010.11
		4/2/2008	5.09	1012.07
2	1015.60	3/7/2008	3.42	1012.18
		4/2/2008	3.46	1012.14
3	1015.45	3/7/2008	2.96	1012.49
		4/2/2008	2.98	1012.47
4	1016.98	3/7/2008	6.8	1010.18
		4/2/2008	3.98	1013
5	1014.55	3/7/2008	2.93	1011.62
		4/2/2008	2.95	1011.6
6	1015.44	3/7/2008	4.64	1010.8
		4/2/2008	3.64	1011.8
7	1017.34	3/7/2008	2.86	1014.48
		4/2/2008	2.78	1014.56
8	1014.49	3/7/2008	4.15	1010.34
		4/2/2008	3.02	1011.47
9	1015.10	3/7/2008	3.69	1011.41
		4/2/2008	3.24	1011.86
10	1018.42	3/7/2008	3.35	1015.07
		4/2/2008	3.45	1014.97
11	1018.20	3/7/2008	3.64	1014.56
		4/2/2008	3.76	1014.44
12	1020.11	3/7/2008	7.78	1012.33
		4/2/2008	7.15	1012.96
13	1016.90	3/7/2008	7.09	1009.81
		4/2/2008	5.82	1011.08
14	1015.46	4/2/2008	8	1007.46
16	1014.34	3/7/2008	4.8	1009.54
		4/2/2008	3.52	1010.82
17	1015.81	3/7/2008	4.44	1011.37
		4/2/2008	3.92	1011.89
18	1010.77	3/7/2008	2.51	1008.26
		4/2/2008	2.65	1008.12
19	1020.28	3/7/2008	8.01	1012.27
		4/2/2008	6.84	1013.44
20	1018.75	3/7/2008	5.57	1013.18
		4/2/2008	4.93	1013.82
21	1020.06	3/7/2008	8.03	1012.03
		4/2/2008	7.8	1012.26
23	1014.75	3/7/2008	8.01	1006.74
		4/2/2008	7.45	1007.3
24	1014.29	3/7/2008	7.8	1006.49

Mcintosh Lalani

GROUNDWATER SUMMARY SHEET

CLIENT MMM Group

PROJECT NAME Olds Mountain View Subdivision

PROJECT NUMBER 3899

DATE 4/14/2008

Borehole	Surface Elevation	Date of Reading	Depth to Groundwater	Groundwater Elevation
24	1014.29	4/2/2008	5.28	1009.01
25	1013.98	3/7/2008	6.83	1007.15
		4/2/2008	4.14	1009.84
27	1010.62	3/7/2008	3.61	1007.01
		4/2/2008	3.77	1006.85
28	1019.36	3/7/2008	5.3	1014.06
		4/2/2008	5.35	1014.01
29	1018.68	3/7/2008	5.53	1013.15
		4/2/2008	5.34	1013.34
32	1015.21	3/7/2008	8.98	1006.23
		4/2/2008	8.93	1006.28
33	1013.57	4/2/2008	5.82	1007.75
34	1014.53	3/7/2008	7.66	1006.87
		4/2/2008	6.34	1008.19
35	1013.00	4/2/2008	6.29	1006.71

LAB TESTING

ATTERBERG LIMITS' RESULTS

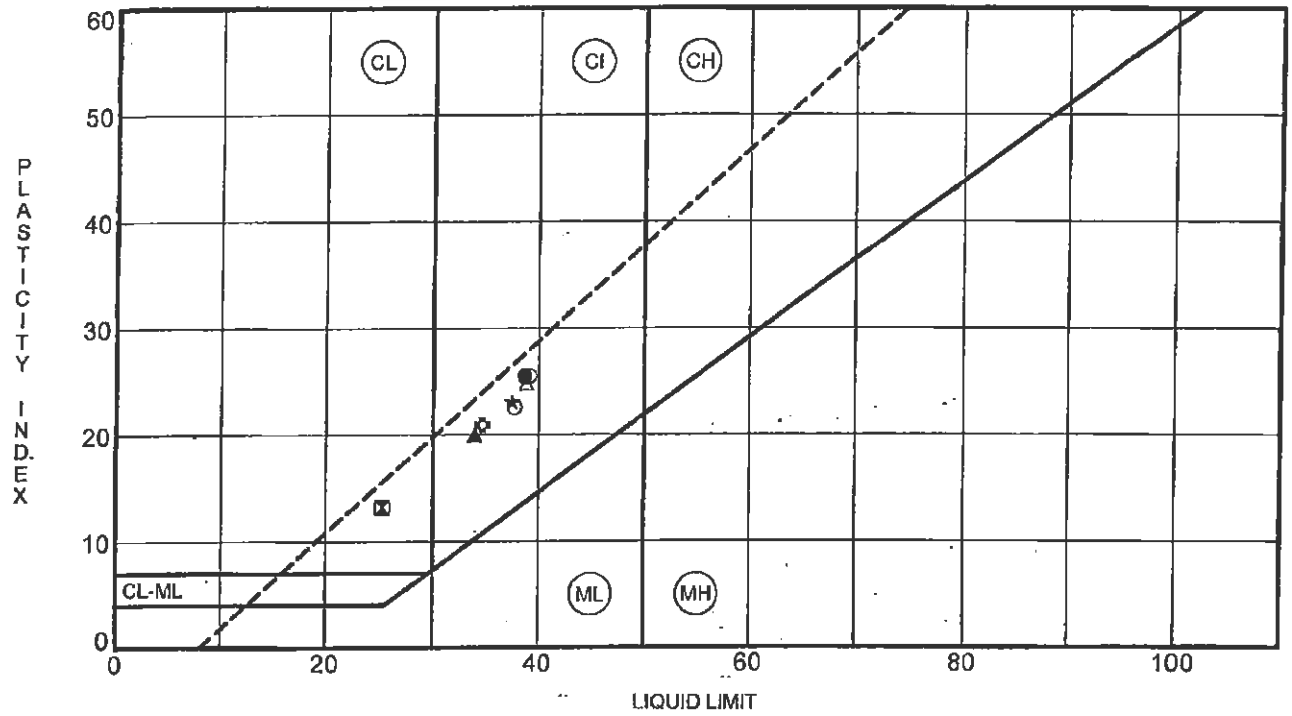
McIntosh Lalani

CLIENT MMM Group

PROJECT NAME Olds Mountain View Subdivision

PROJECT NUMBER 3899

PROJECT LOCATION Olds, AB



	Specimen Identification		LL	PL	PI	Fines	Classification
●	BH-3	0.8 (m)	39	13	26		
⊠	BH-7	0.8 (m)	25	12	13		
▲	BH-12	3.8 (m)	34	14	20		
★	BH-15	3.2 (m)	37	14	23		
⊙	BH-18	2.3 (m)	39	14	25		
✿	BH-29	7.8 (m)	35	14	21		
○	BH-31	4.7 (m)	38	15	23		
△	BH-34	3.8 (m)	39	14	25		

ATTERBERG LIMITS 3099 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/24/08

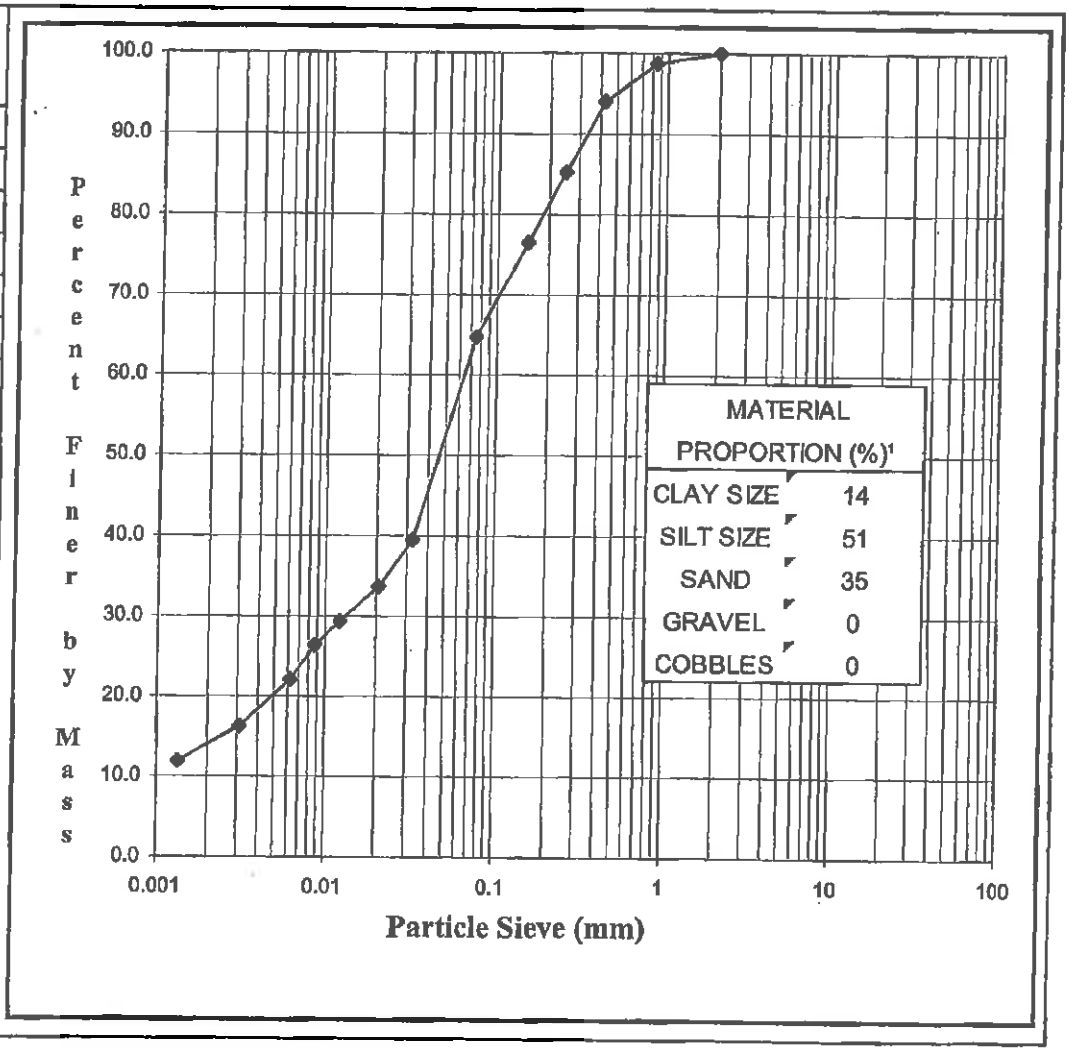
McINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: **Olds Mountian View Subdivision**
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 36-1
SAMPLE NO.: 11164
DEPTH: 2.5'
DESCRIPTION: Sandy Silt, some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	98.7
425 µm	94.0
250 µm	85.2
150 µm	76.5
75 µm	64.8
32 µm	39.5
21 µm	33.7
12 µm	29.3
9 µm	26.4
6 µm	22.1
3 µm	16.3
1 µm	11.9



Reviewed by: _____ EIT ~~P.Eng.~~

Note 1: Classified by the Modified Unified Soil Classification System

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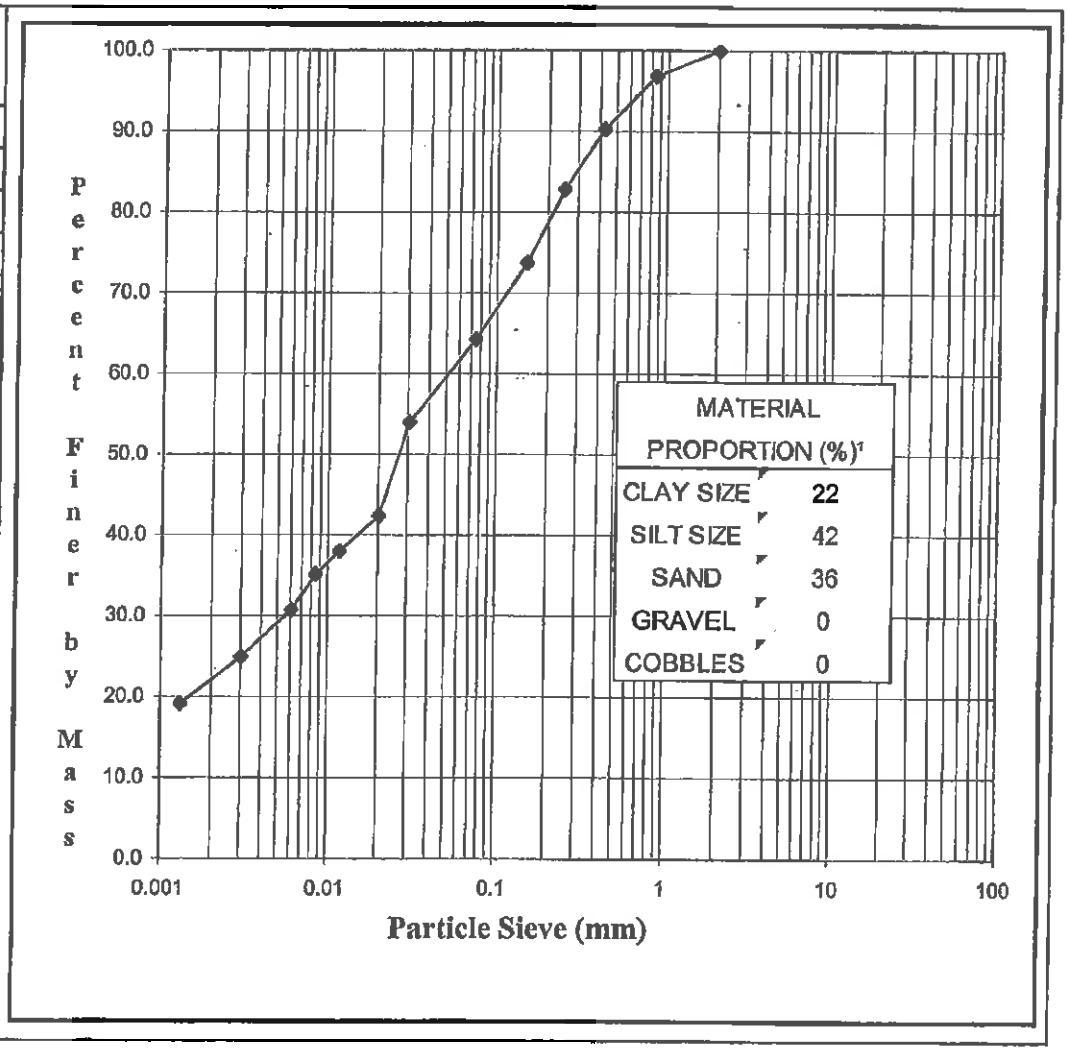
McINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: **Olds Mountian View Subdivision**
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 37-1
SAMPLE NO.: 11164
DEPTH: 2.5'
DESCRIPTION: Silty Sand some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	96.9
425 µm	90.2
250 µm	82.8
150 µm	73.7
75 µm	64.2
31 µm	54.0
20 µm	42.4
12 µm	38.0
8 µm	35.1
6 µm	30.8
3 µm	25.0
1 µm	19.2



Reviewed by: _____ EIT P.Eng.

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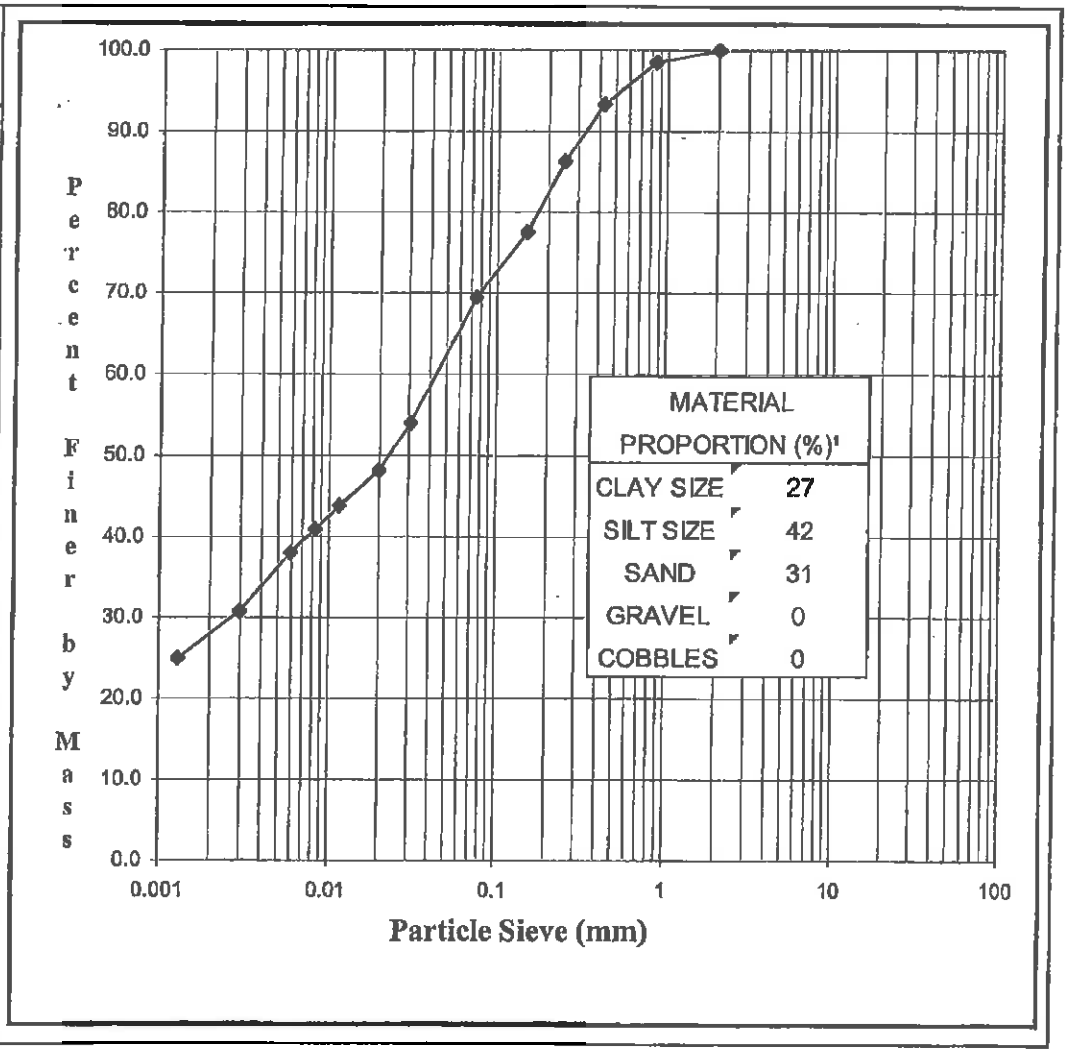
McINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: **Olds Mountian View Subdivision**
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 38-2
SAMPLE NO.: 11164
DEPTH: 7.5'
DESCRIPTION: Silty Sand some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	98.5
425 µm	93.4
250 µm	86.3
150 µm	77.5
75 µm	69.4
31 µm	54.0
20 µm	48.2
12 µm	43.8
8 µm	40.9
6 µm	38.0
3 µm	30.8
1 µm	25.0



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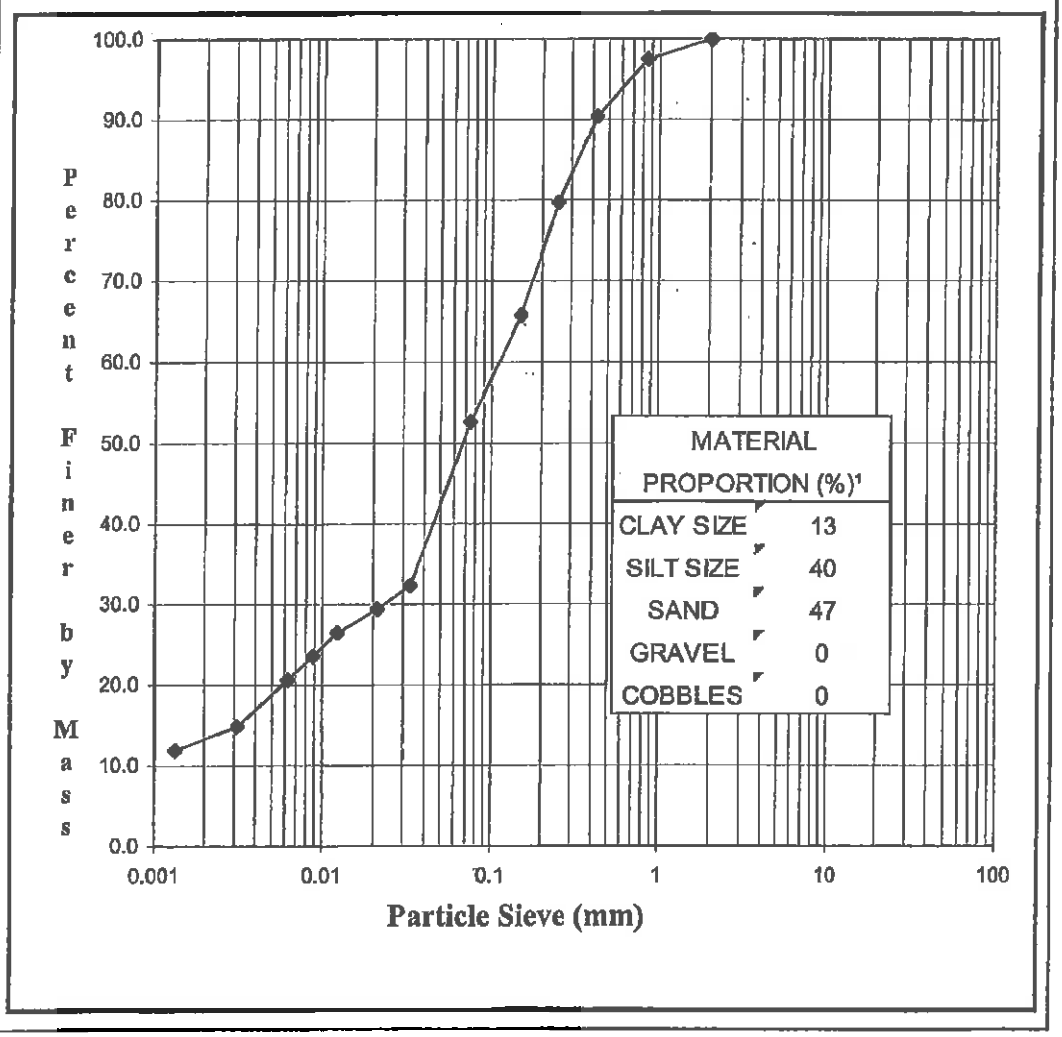
McINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: **Olds Mountian View Subdivision**
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 39-1
SAMPLE NO.: 11164
DEPTH: 2.5'
DESCRIPTION: Silty Sand some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	97.5
425 µm	90.3
250 µm	79.7
150 µm	65.8
75 µm	52.6
33 µm	32.3
21 µm	29.4
12 µm	26.5
9 µm	23.6
6 µm	20.7
3 µm	14.8
1 µm	11.9



Reviewed by: _____ EIT ~~P.Eng.~~

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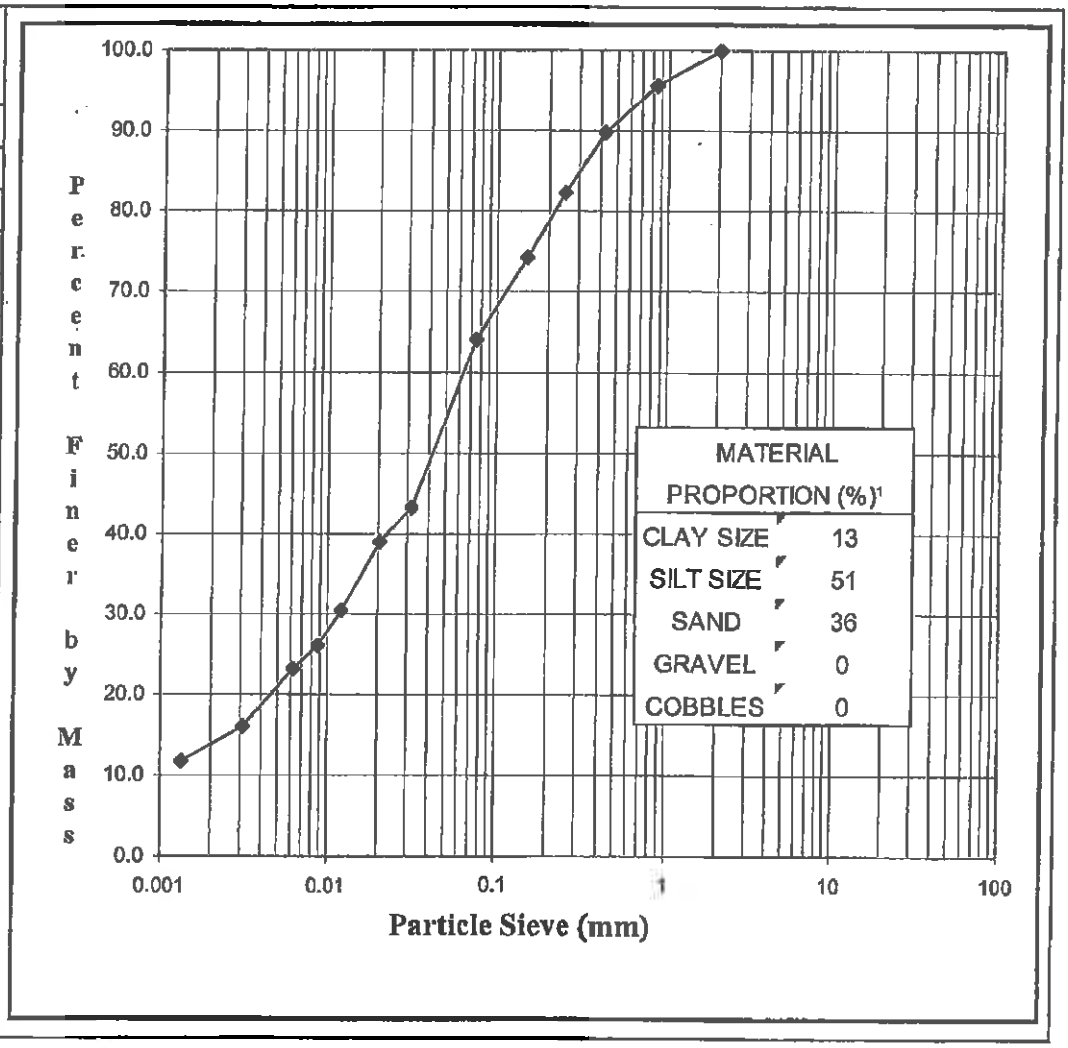
McINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: **Olds Mountian View Subdivision**
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 40-1
SAMPLE NO.: 11164
DEPTH: 2.5'
DESCRIPTION: Sandy Silt, some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	95.6
425 µm	89.8
250 µm	82.3
150 µm	74.2
75 µm	64.0
32 µm	43.3
20 µm	39.0
12 µm	30.4
9 µm	26.1
6 µm	23.2
3 µm	16.1
1 µm	11.8



Reviewed by: _____ EIT ~~P.Eng.~~

Note 1: Classified by the Modified Unified Soil Classification System

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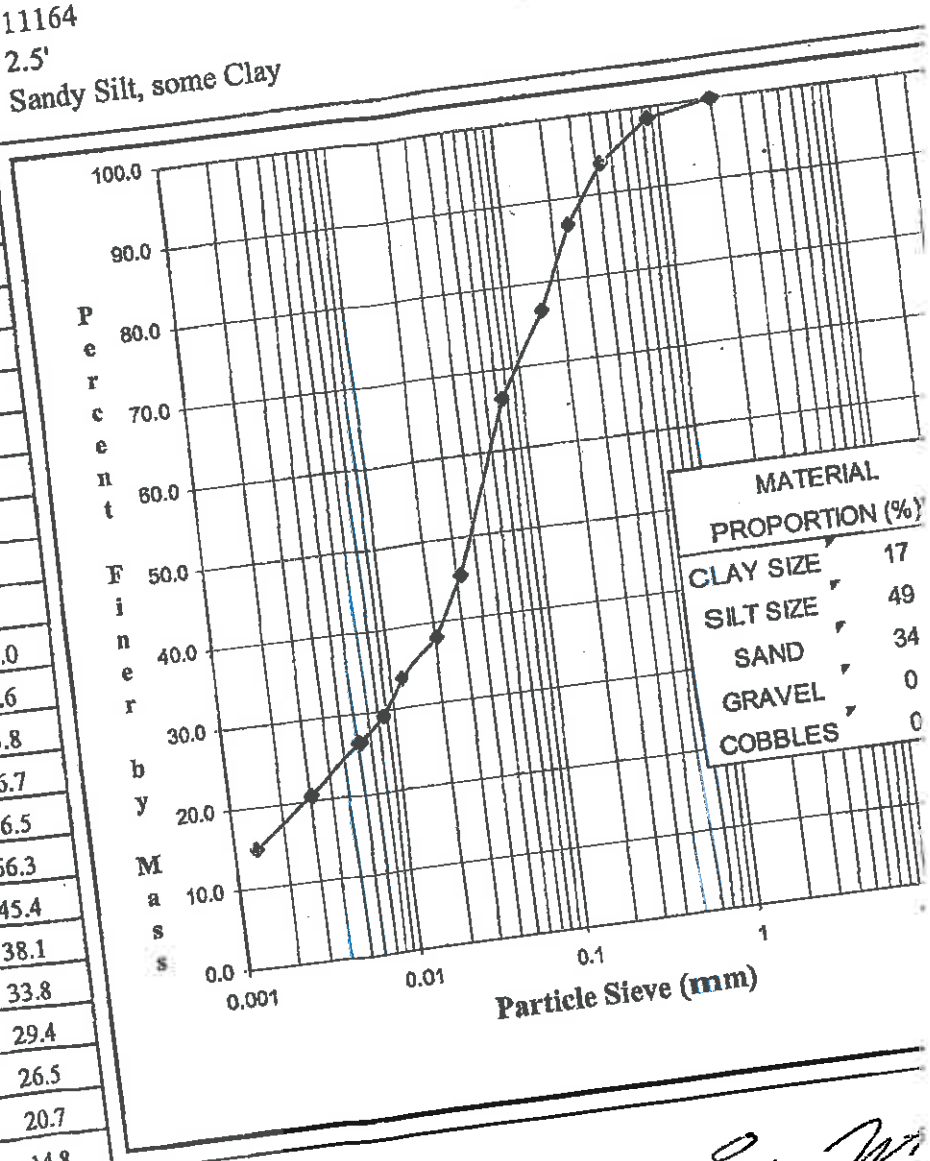
MCINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: Olds Mountian View Subdivision
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 41-1
SAMPLE NO.: 11164
DEPTH: 2.5'
DESCRIPTION: Sandy Silt, some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	98.6
425 µm	93.8
250 µm	86.7
150 µm	76.5
75 µm	66.3
53 µm	45.4
38 µm	38.1
12 µm	33.8
9 µm	29.4
6 µm	26.5
3 µm	20.7
1 µm	14.8



Reviewed by: _____

Classified by the Modified Unified Soil Classification System

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The testing services reported were performed in accordance with recognized industry standards. These data do not include opinions or interpretations as to compliance or material suitability. ML will provide it upon written request.

APPENDIX A

BOREHOLE LOGS

APPENDIX A

BOREHOLE LOGS

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:1
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1017.16

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0			Topsoil - approx. 100mm thick.			TPSL						1017
			Silty Clay (Till) - stiff, damp, some sand, trace gravel, medium plastic, trace coal, light brown.		1-1			9.6		$[SO_4]$ = 0.03%		
1			- cobbles. - trace sand, medium brown.									1016
2					1-2			9.0				1015
3						CI						1014
			- trace oxides.		1-3			12.5				
4												1013
5	▼				1-4			11.3				1012
6												1011
			Silt - dense, damp, weathered, some siltstone, medium grey.		1-5	ML						
7												1010
8			Silty Clay (Till) - stiff, damp, trace gravel, medium plastic, medium grey.		1-6	CI						1009
9												1008
			END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion. Water Levels: March 07, 2008 - 7.05 M April 02, 2008 - 5.09 M									
10												1007

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

McIntosh Lalani Engineering
Calgary, AB
(403) 291-2345

Logged By: Dominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 5.09 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:2
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.60

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1015
1		Sandy Silt (Till) - compact, damp, trace clay and gravel, light brown.		2-1	MLS		11.2				
2				2-2		9-10-18	9.7				1014
		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace coal and oxides, medium brown.		2-3							1013
3		- trace sandstone.		2-4		4-10-13	11.4				
4		- sand lenses throughout.		2-5							1012
5		- poor recovery, rock in spoon.		2-6	CI	8-16-18	6.8				1011
				2-7							1010
6		- medium grey.		2-8		4-14-15	11.6				
7				2-9							1009
8		Bedrock (Siltstone) - strong, dry, platey, medium grey.		2-10		2-8-9					1008
		- hard drilling.		2-11	BE						1007
9											
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1006
10		Water Levels: March 07, 2008 - 3.42 M April 02, 2008 - 3.46 M									1005

M/L STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

McIntosh Lalani Engineering
Calgary, AB
(403) 291-2345

Logged By: Dominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 3.42 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:3
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.45

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC — M.C. — LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1015
		Silty Clay (Till) - stiff, damp, some sand, trace gravel, medium plastic, trace oxides and coal, medium brown.		3-1			10.9 — PI = 25.5				
1					CI						1014
2		- sand lense.		3-2			12.7				1013
3		Bedrock (Sandstone) - strong, dry, light brown.			BE						1012
4				3-3							1011
		END OF HOLE at a depth of 4.3m. 25mm PVC standpipe installed to a depth of 4.3m with 2.4m slotted. Dry upon completion.									
5		Water Levels: March 07, 2008 - 2.96 M April 02, 2008 - 2.98 M									1010
6											1009
7											1008
8											1007
9											1006
10											1005

ML STANDARD AUGER 3899. OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/24/08

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Logged By: Dominik Ken	Completion Depth: 14 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 2.96 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:4
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1016.98

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick			TPSL						
		Silty Clay (Till) - firm, damp, some sand, trace gravel, low to medium plastic, trace oxides, light brown.		4-1			10.2				1016
1											
		- trace sand and coal, spoon bouncing on a cobble.		4-2		bouncing	10.0				1015
2		- stiff.		4-3							
				4-4		6-10-16	12.5				1014
3											
				4-5	CI						1013
4											
				4-6		4-9-13	13.8				1012
5				4-7							
		- medium grey.		4-8		3-4-7	13.8				1011
6				4-9							
											1010
7				4-10		3-5-10					
		REFUSAL on a boulder at a depth of 7.9m. 25mm PVC standpipe installed to a depth of 7.9m with 6.1m slotted. Dry upon completion.									1009
8											
		Water Levels: March 07, 2008 - 6.80 M April 02, 2008 - 3.98 M									1008
9											
											1007
10											

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Logged By: Dominik Ken	Completion Depth: 26 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 3.98 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:5
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.55

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1014
		Silty Clay (Till) - firm, damp, some sand, trace gravel, medium plastic, trace oxides, medium brown.		5-1			11.9		$[SO_4]$ = 0.02%		
1		- trace sand.			CI						1013
		- stiff.									
2		- trace sandstone, low plastic.		5-2			11.3				1012
		- low to medium plastic.									
3											1011
				5-3			13.1				
4					CL-ML						1010
5		- trace free water, sand lense, medium grey.		5-4			14.0				1009
6		Silt - dense, dry, medium grey.			ML						1008
		Silty Clay (Till) - stiff, damp, trace gravel, medium plastic, trace oxides, medium grey.		5-5			12.6				
7											1007
8		- moist.			CI						1006
				5-6							
9											1005
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									
10		Water Levels: March 07, 2008 - 2.93 M April 02, 2008 - 2.95 M									1004

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Logged By: Dominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 2.93 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:6
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.44

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						
		Sandy Silt (Till) - dense, damp, trace gravel, light brown.		6-1	MLS		10.1				1015
1											
				6-2		5-15-7					1014
2		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		6-3			12.4				1013
3				6-4		6-8-9					
											1012
4				6-5	CI		14.9				
											1011
5		- spoon on a rock.		6-6		7@4"					
				6-7							1010
6		REFUSAL on a boulder at a depth of 5.5m. 25mm PVC standpipe installed to a depth of 5.5m with 3.0m slotted. Dry upon completion.									1009
7		Water Levels: March 07, 2008 - 4.64 M April 02, 2008 - 3.64 M									1008
8											1007
9											1006
10											1005

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Logged By: Dominik Ken	Completion Depth: 18 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 3.64 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:7
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1017.34

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1017
		Silty Clay (Till) - stiff, damp, some sand, trace gravel, medium plastic, trace oxides, medium brown.		7-1			11.0 PI = 13.2				
1											1016
		- trace sand and coal.									
2				7-2			11.7				1015
3											
				7-3			11.3				1014
4					CI						
											1013
5				7-4			11.6				
6		- medium grey.									1012
				7-5			14.6				1011
7											
											1010
8											
				7-6							1009
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1008
10		Water Levels: March 07, 2008 - 2.86 M April 02, 2008 - 2.78 M									1007

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Logged By: Cominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 2.78 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:8
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.49

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 225mm thick.			TPSL						1014
1		Silt (Till) - compact, moist, trace sand, clay and gravel, trace oxides, medium brown.		8-1	ML		15.4				1013
2				8-2		2-5-6	11.9				1012
3				8-3							1011
		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		8-4		5-7-16	14.1				1010
4				8-5							1009
5		- trace siltstone.		8-6		6-13-14	11.5				1008
		- medium grey.		8-7	CI						1007
6				8-8		3-7-11	12.1				1006
7				8-9							1005
8		- trace fine grain sand lenses throughout.		8-10		3-6-8					1004
		- no sand lenses.		8-11							
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									
10		Water Level: March 07, 2008 - 4.15 M April 02, 2008 - 3.02 M									

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Marlin	Drilled on: 2/20/2008
Groundwater Depth: 3.02 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:9
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.10

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC — M.C. — LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1015
		Silty Clay (Till) - stiff, damp, some sand, trace gravel, medium plastic, trace oxides, medium brown.		9-1			18.5		$[SO_4]$ = 0.02%		
1		- trace sand.									1014
2		- gravel lense.		9-2			16.1				1013
3											1012
				9-3			11.3				
4		- medium grey.			CI						1011
5				9-4			13.2				1010
6											1009
7				9-5							1008
8											1007
				9-6							
9											1006
10		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 6.1m with 4.6m slotted. 3.0m of slough in hole. Dry upon completion.									1005
		Water Levels: March 07, 2008 - 3.69 M April 02, 2008 -3.24 M									

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Logged By: Dominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 3.24 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:10
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1018.42

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1018
		Sandy Silt - compact, damp, light brown.		10-1	MLS		9.6				
1											1017
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		10-2			12.5				1016
3											
		- medium grey.		10-3			16.5				1015
4											1014
5				10-4	CI		11.2				1013
6											1012
7				10-5							1011
8											1010
				10-6							
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1009
10		Water Levels: March 07, 2008 - 3.35 M April 02, 2008 - 3.45 M									1008

M:_STANDARD AUGER 3899_OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 3.35 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:11
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1018.20

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1018
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		11-1	ML		7.4				
1											1017
		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		11-2		3-5-8	11.8				
2				11-3							1016
3				11-4		2-7-9	13.4				1015
		- medium grey.		11-5							
4											1014
5				11-6	CI	1-7-8	12.9				1013
				11-7							
6				11-8		2-3-7					1012
7				11-9							1011
8				11-10		3-4-7					1010
				11-11							
9		Silt (Till) - compact, damp, trace sand and siltstone, medium grey.			ML						1009
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1008
10		Water Levels: March 07, 2008 - 3.64 M April 02, 2008 - 3.76 M									

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 3.64 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:12
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1020.11

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 175mm thick.			TPSL						1020
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		12-1			6.9				
1											1019
		- damp, some clay, medium brown.			ML						
2		- sand lense approx. 75mm thick, dry, fine to medium grain.		12-2			10.1				1018
		- trace clay.									
		- some clay.									
3		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.									1017
				12-3			10.1 PI = 19.9				
4											1016
5				12-4			12.1				1015
6		- trace sandstone, greyish brown.			α						1014
				12-5			10.1				
7											1013
8				12-6							1012
9											1011
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									
10		Water Levels: March 07, 2008 - 7.78 M April 02, 2008 - 7.15 M									1010

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/19/2008
Groundwater Depth: 7.15 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:13
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1016.90

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, medium brown.		13-1	ML		108		$[SO_4]$ = 0.147%		
1		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		13-2		4-5-8	127				1016
2				13-3							1015
3		- dark brown.		13-4		4-8-10	133				1014
				13-5							1013
4											
				13-6		5-8-10	135				1012
5		- trace siltstone, no gravel, medium grey.		13-7	CI						1011
6				13-8		4-8-10					
		- trace gravel, greyish brown.		13-9							1010
7											
		- trace sandstone, trace free water in spoon, medium grey.		13-10		5-5-8					1009
8				13-11							1008
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1007
10		Water Levels: March 07, 2008 - 7.09 M April 02, 2008 - 5.82 M									1006

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: 5.82 m	Page 1 of 1

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:14
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.46

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						1015
1		Silt (Till) - compact, dry, some sand, trace gravel, trace oxides, light brown.		14-1	ML		5.5				1014
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		14-2			12.8				1013
3											
4				14-3			13.1				1012
5					CI						1011
6		- trace siltstone, medium grey.		14-4			13.0				1010
7				14-5							1009
8											1008
9				14-6							1007
10		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion. Water Levels: March 07, 2008 - Dry at 8.74m April 02, 2008 - 8.0m									1006 1005

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: 8 m	Page 1 of 1

Project: Old's Mountain View Subdivision	Drilling Information:	Borehole No.:15
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.29

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 175mm thick.			TPSL						1014
1		Silt (Till) - compact, dry, some sand, trace gravel, trace oxides, light brown.		15-1	ML		25				1013
2		- spoon on a rock.		15-2		bouncing					1012
3		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		15-3			8.8				1011
		- very stiff, trace precipitates in spoon.		15-4		4-7-11	11.1 PI = 23.1		$[SO_4]$ = 1.070%		
4				15-5							1010
5		- trace sandstone, medium grey.		15-6		4-8-11	12.0				1009
				15-7	CI						
6		- poor sample recovery.		15-8		5-8-9					1008
7				15-9							1007
8				15-10		5-7-10					1006
				15-11							
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1005
10		Water Levels: March 07, 2008 - Dry to 9.07m April 02, 2008 - Dry to 9.03m									1004

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/24/08

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Calgary, AB
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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:16
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.34

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 150 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 305mm thick.			TPSL						1014
1		Silt (Till) - compact, damp, trace sand and gravel, trace oxides and coal, medium brown. - trace clay.		16-1	ML		16.8				1013
2		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, low plastic, trace oxides and coal, medium brown. - medium plastic.		16-2	CL-ML		12.2				1012
3											1011
4				16-3			12.2				1010
5		- dark brown.		16-4	CI		11.5				1009
6		- moist, dark grey.									1008
7				16-5							1007
8				16-6							1006
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion. Water Levels: March 07, 2008 - 4.80 M April 02, 2008 - 3.52 M									1005
10											1004

ML STANDARD AUGER 3899. OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 3.52 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:17
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.81

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						1015
1		Till - compact, damp, trace sand, clay and gravel, trace oxides, medium brown.		17-1	ML		9.4				
		- some clay.									
2		Silty Clay (Till) - very stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		17-2		9-11-14	10.4				1014
				17-3							
3				17-4		2-8-9	12.9				1013
4				17-5							1012
5		- dark greyish brown.		17-6		5-14-12	13.2				1011
				17-7	CI						
6				17-8		3-10-14					1010
7				17-9							1009
8		- trace sandstone, medium grey.		17-10		4-7-9					1008
				17-11							
9											1007
10		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1006
		Water Levels: March 07, 2008 - 4.44 M April 02, 2008 - 3.92 M									1005

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 3.92 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:18
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1010.77

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 305mm thick.			TPSL						1010
1		Silt - compact, damp, trace sand, dark grey.		18-1	ML		11.9				1009
		Silt (Till) - compact, damp, trace sand and gravel, trace oxides, medium brown.									
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		18-2			18.4 Pl = 25.5				1008
3											
4				18-3	CI		13.6				1007
5		- greyish brown.		18-4			12.9				1006
6											1005
7		Bedrock (Sandstone) - very strong, damp, medium grey. REFUSAL in bedrock at a depth of 6.8m. 25mm PVC standpipe installed to a depth of 6.8m with 4.6m slotted. Dry upon completion.		18-5	BE						1004
8		Water Levels: March 07, 2008 - 2.51 M April 02, 2008 - 2.65 M									1003
9											1002
10											1001
											1000

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/24/08

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Logged By: Scott Bryan	Completion Depth: 22.3 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 2.51 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:19
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1020.28

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	SLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0			Topsoil - approx. 150mm thick.			TPSL						1020
			Silt (Till) - compact, dry, some sand, trace gravel, trace oxides, light brown.		19-1			15.2				
1			- damp, trace sand and clay, medium brown.			ML						1019
					19-2		6-8-11		■			
2			Silty Sand - compact, damp, fine to medium grain, medium brown.		19-3			7.2				1018
						SM						
3			Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		19-4		4-11-14@4"	32.7				1017
			- spoon on a rock.		19-5				●			
4												1016
					19-6		3-9-16	13.3	■			
5					19-7				●			1015
			- dark brownish grey.									
6												1014
			- spoon on a rock, medium grey.			CI						
7	▼				19-8			11.4	●			1013
					19-9		2-4-8		■			
8												1012
					19-10				●			
9												1011
			END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									
10			Water Levels: March 07, 2008 - 8.01 M April 02, 2008 - 6.84 M									1010

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 6.84 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:20
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1018.75

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 225mm thick.			TPSL						1018
		Sandy Silt (Till) - compact, dry, trace gravel and oxides, light brown.		20-1	MLS		11				
1											1017
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		20-2			12.2		$[SO_4]$ = 0.017%		1016
3		- dark brownish grey.									
4				20-3			12.1				1015
		- medium grey.									1014
5				20-4	CI		12.7				
6											1013
7				20-5							1012
8											1011
				20-6							1010
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1009
10		Water Levels: March 07, 2008 - 5.57 M April 02, 2008 - 4.93 M									1008

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/1/408

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 4.93 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:21
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1020.06

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						1020
		Silt (Till) - compact, dry, trace sand and gravel, light brown.		21-1	ML		4.5				
1											1019
				21-2		14-10-10	9.9				
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		21-3							1018
3				21-4		4-7-11	13.0				1017
				21-5							
4											1016
				21-6		4-8-12	13.1				
5											1015
				21-7	CI						
6											1014
		- dark grey.		21-8		4-6-10	12.6				
7				21-9							1013
	▼			21-10		3-4-7					
8		- trace sandstone.									1012
				21-11							
9											1011
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									
10		Water Levels: March 07, 2008 - 8.03 M April 02, 2008 - 7.80 M									1010

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/19/2008
Groundwater Depth: 7.8 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:22
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1017.48

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKET PEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		22-1	ML		5.2				1017
1											
2		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		22-2			10.7				1016
3											1015
4				22-3			12.7				1014
		- moist.									1013
5				22-4	CI		13.6				1012
6		- damp to moist, medium grey.									1011
7				22-5							1010
8		- some sand, lense throughout.									1009
		- trace siltstone, light grey.		22-6							1008
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1007
10		Water Levels: March 07, 2008 - Dry to 8.78m April 02, 2008 - Dry to 8.79m									

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/19/2008
Groundwater Depth: m	Page 1 of 1

ML STANDARD AUGER 3899. OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:23
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.75

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 175mm thick.			TPSL						1014
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		23-1			8.2		$[SO_4]$ = 0.130%		
1		- trace clay.			ML						
				23-2		3-7-9	11.1				1013
2		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		23-3							
3				23-4		4-5-9	12.6				1012
		- moist.		23-5							1011
4											
				23-6		3-7-10	12.2				1010
5		- medium grey.		23-7	CI						
											1009
6				23-8		3-6-9					
				23-9							1008
7											
				23-10		2-4-8					1007
8											
		Silty Sand - compact, damp, medium grain, medium grey.		23-11	SM						1006
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Wet upon completion.									
		Water Levels: March 07, 2008 - 8.01 M April 02, 2008 - 7.45 M									1005
10											
											1004

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: 7.45 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:24
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.29

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 200mm thick.			TPSL						1014
		Silt (Till) - compact, damp, trace clay, sand and gravel, trace oxides, medium brown.		24-1			8.1				
1		- some clay.			ML						1013
2		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		24-2			12.6				1012
3		- dark brown.									1011
4				24-3			13.4				1010
		- moist, medium grey.									
5	▼			24-4	CI		13.6				1009
6											1008
		- trace siltstone.		24-5							
7											1007
8				24-6							1006
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1005
10		Water Levels: March 07, 2008 - 7.80 M April 02, 2008 - 5.28 M									1004

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: 5.28 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:25
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1013.98

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 225mm thick.			TPSL						
		Sill (Till) - compact, damp, some clay, trace sand and gravel, trace oxides, medium brown.		25-1	ML		7.5				
1		- trace clay, light brown.									1013
		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		25-2		3-7-8	12.3				
2				25-3							1012
3				25-4		3-6-10	13.4				1011
		- dark brown.		25-5							
4											1010
				25-6		4-10-10	12.8				
5		- dark grey.		25-7	CI						1009
6				25-8		4-7-8	12.5				1008
				25-9							
7											1007
8				25-10		2-6-9					1006
				25-1							
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1005
10		Water Levels: March 07, 2008 - 6.83 M April 02, 2008 - 4.14 M									1004

ML STANDARD AUGER 3899. OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 4.14 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:26
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.52

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1014
		Sandy Silt - dense, damp, trace gravel and oxides, light brown.		26-1	MLS		18		$[SO_4]$ = 0.02%		
1											1013
		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		26-2			130				
2											1012
3				26-3			131				1011
4											1010
5				26-4	CI		123				1009
6		- gravel lense.									1008
		- medium grey.		26-5							
7											1007
8											1006
				26-6							
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1005
10		Water Levels: March 07, 2008 - Dry to 9.03m April 02, 2008 - Dry to 9.02m									1004

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

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Logged By: Dominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:27
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1010.62

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1010
1		Silty Clay (Till) - very stiff, damp, trace sand and gravel, low plastic, trace oxides and coal, medium brown.		27-1	CL-ML		10.7				
2		- medium plastic.		27-2		7-10-13	12.5				1009
		- sandstone cobble.		27-3							
3				27-4	CI	6-10-13	12.1				1008
4				27-5							1007
5				27-6		12-13-18	13.2				1006
		Silt - compact, damp, trace sand, olive brown.		27-7	ML						
6		Silty Clay (Till) - hard, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		27-8		7-11-19	13.0				1005
7				27-9	CI						1004
				27-10		4/9-bouncing					1003
8		Bedrock (Sandstone) - very strong, dry, light brown.		27-11	BE						
		END OF HOLE at a depth of 8.2m. 25mm PVC standpipe installed to a depth of 8.2m with 6.1m slotted. Dry upon completion.									1002
9		Water Levels: March 07, 2008 - 3.61 M April 02, 2008 - 3.77 M									1001
10											1000

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ, M-L STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 27 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 3.61 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:28
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1019.36

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0			Topsoil - approx. 75mm thick.			TPSL						1019
			Silty Sand - compact, dry, medium grain, light brown.		28-1			6.2				
1						SM						1018
2					28-2			7.3				1017
3			Silt (Till) - compact, damp, trace sand, medium brown.									
					28-3	ML		10.8				1016
4												1015
			Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.									
5	▼		- medium grey with trace medium brown.		28-4			13.4				1014
6												1013
			- trace free water.		28-5	CI						
7												1012
8					28-6							1011
9			END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1010
10			Water Levels: March 07, 2008 -5.30 M April 02, 2008 - 5.35 M									1009

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 5.3 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:29
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1018.68

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | CRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1018
		Sandy Silt - compact, dry, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		29-1	MLS		3.8				
1											
				29-2		7-9-9					1017
2		Silty Clay (Till) - very stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		29-3			11.2				
											1016
3		- dark brown.		29-4		3-7-11	12.4				
				29-5							1015
4											
				29-6		3-8-10					1014
5				29-7	CI						
											1013
6		- dark brownish grey.		29-8		3-8-10	13.4				
		- dark grey.									1012
7				29-9							
		- stiff.		29-10		2-4-7	14.6 PI = 20.9				1011
8											
				29-11							1010
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1009
10		Water Levels: March 07, 2008 - 5.53 M April 02, 2008 - 5.34 M									1008

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:30
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1019.11

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSC						1019
		Silt (Till) - compact, dry, trace clay, sand and gravel, trace oxides and coal, medium brown.									
1		- some sand.		30-1	ML		9.7		$[SO_4]$ = 0.02%		1018
2		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		30-2			11.6				1017
3		- moist.									1016
4				30-3			13.4				1015
5		- dark brownish grey.									1014
				30-4	CI		13.2				
6		- dark grey.									1013
7				30-5							1012
		- trace sandstone.									
8				30-6							1011
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1010
10		Water Levels : March 07, 2008 - Dry to 8.74m April 02, 2008 - Dry to 8.75m									1009

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:31
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1017.59

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		31-1	ML		3.9				1017
1											
				31-2		8-9-13					1016
2		Silty Clay (Till) - very stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		31-3			10.1				1015
3				31-4		3-7-13	11.6				
				31-5							1014
4											
		- medium grey.		31-6		3-6-14	12.7 PI = 22.6				1013
5				31-7	CI						
											1012
6		- no spoon, rock in hole.									
				31-8			13.1				1011
7											
				31-9		2-4-10					1010
8											
				31-10							1009
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1008
10		Water Levels March 07, 2008 - Dry to 8.60m April 02, 2008 - Dry to 8.58m									1007

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/19/2008
Groundwater Depth: m	Page 1 of 1

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Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:32
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.21

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 200mm thick.			TPSL						1015
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		32-1			7.5				
1		- some gravel.			ML						1014
2		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		32-2			8.6				1013
3											1012
				32-3			12.6				
4											1011
5				32-4	CI		13.2				1010
6		- trace siltstone, medium grey.									1009
				32-5							
7											1008
8				32-6							1007
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1006
10		Water Levels: March 07, 2008 - 8.98 M April 02, 2008 - 8.93 M									1005

ML STANDARD AUGER 3899. OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: 8.93 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:33
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1013.57

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKET PEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 330mm thick.			TPSL						1013
1		Silt (Till) - compact, damp, trace sand and gravel, trace oxides and coal, medium brown. - trace clay.		33-1	ML		9.8		$[SO_4]$ = 0.03%		
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, low plastic, trace oxides and coal, medium brown.		33-2		4-7-7	16.6				1012
3		- medium plastic.		33-3	CL-ML						1011
4				33-4		3-6-7	14.0				1010
5		- dark brown.		33-5							1009
6		- dark grey.		33-6		3-6-9	31.0				1008
7				33-7							1007
8				33-8	CI	3-7-8					1006
9				33-9							1005
10		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion. Water Levels: March 07, 2008 - Dry to 8.96m April 02, 2008 - 5.82m		33-10		2-6-9					1004
				33-11							1003

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/1/408

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 5.82 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:34
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.53

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 225mm thick.			TPSL						1014
1		Silt (Till) - compact, damp, trace clay, sand and gravel, trace oxides, dark brown.		34-1			21.8				1013
2		- some clay.		34-2	ML		10.9				1012
3		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, dark brown.		34-3			14.1 PI = 24.8				1011
4											1010
5				34-4	CI		12.6				1009
6											1008
7		Silt - compact, damp, trace siltstone, olive brown.		34-5	ML		13.3				1007
8		Silty Clay (Till) - stiff, moist, trace sand, gravel and siltstone, medium plastic, trac oxides and coal, dark brown with trace light grey.		34-6	CI		13.7				1006
9		END OF HOLE at a depth of 9.1m 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1005
10		Water Levels: March 07, 2008 - 7.66 M April 02, 2008 - 6.34 M									1004

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION GPJ ML STANDARD.GDT 4/24/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 6.34 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:35
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1013.00

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	SLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 175mm thick.			TPSL						
		Silt (Till) - compact, damp, trace sand and gravel, trace oxides, light brown.		35-1			11.0				
1					ML						1012
				35-2		4-8-9	11.9		$[SO_4]$ = 0.02%		
2											1011
		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		35-3							
3											1010
				35-4		3-5-9	11.0				
		- very stiff.		35-5							
4											1009
				35-6		3-10-12	9.2				
5		- dark grey.									1008
				35-7							
					CI						
6				35-8		2-8-9					1007
				35-9							
7											1006
				35-10		2-6-9					
8				35-11							1005
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1004
		Water Levels: March 07, 2008 - Dry at 8.81 M April 02, 2008 - 6.29 M									
10											1003

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 6.29 m	Page 1 of 1

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:36
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 405mm thick.			TPSL						
1		Silt (Till) - compact, damp to moist, trace sand, clay and gravel, trace oxides, medium brown.		44-1	ML		8.2		Clay % = 14, Silt % = 51, Sand % = 35		
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		44-2	CI		13.9				
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.8m slotted. Dry upon completion. Water Levels: March 07, 2008 -Dry to 2.94m April 02, 2008 - Dry to 2.93m									
4											
5											
6											
7											
8											
9											
10											

ML STANDARD AUGER 3899. OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML_STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:37
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						
		Silt (Till) - compact, damp, trace sand and gravel, trace oxides, medium brown.		37-1	ML		8.6		Clay % = 22, Silt % = 42, Sand % = 36		
1		- trace clay.									
		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		37-2	CI		12.8				
2											
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.8m slotted. Dry upon completion.									
		Water Levels: March 07, 2008 - Dry to 3.0m April 02, 2008 - Dry to 3.0m									
4											
5											
6											
7											
8											
9											
10											

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:38
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick			TPSL						
		Silt (Till) - compact, damp, trace clay, sand and gravel, trace oxides, medium brown.		38-1	ML		9.0				
1		- some clay.									
		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.			CI						
2		- trace precipitates.		38-2			13.9		Clay % = 27, Silt % = 42, Sand % = 31		
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.8m slotted. Dry upon completion.									
		Water Levels: March 07, 2008 - Dry to 3.0m April 02, 2008 - Dry to 2.98m									
4											
5											
6											
7											
8											
9											
10											

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:39
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CCRE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						
		Silt (Till) - compact, damp, trace sand, clay and gravel, trace oxides, medium brown. - some clay.		39-1	ML		B4		Clay % = 13, Silt % = 40, Sand % = 47		
1											
		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, low plastic, trace oxides and coal, medium brown.			CL-ML						
2		- medium plastic.		39-2	CI		B2				
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.5m slotted. Dry upon completion.									
		Water Levels: March 07, 2008 - Dry to 2.92m April 02, 2008 - Dry to 2.94m									
4											
5											
6											
7											
8											
9											
10											

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

McIntosh Lalani Engineering
Calgary, AB
(403) 291-2345

Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:40
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						
		Silt (Till) - compact, dry, some sand, trace gravel, trace oxides, light brown.		40-1	ML		3.8		Clay % = 13, Silt % = 51, Sand % = 36		
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		40-2	CI		11.8				
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.5m slotted. Dry upon completion.									
		Water Levels: March 07, 2008 - Dry to 2.92m April 02, 2008 - Dry to 2.93m									
4											
5											
6											
7											
8											
9											
10											

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

McIntosh Lalani Engineering
Calgary, AB
(403) 291-2345

Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:41
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 175mm thick.			TPSL						
		Silt (Till) - compact, damp, trace sand and gravel, trace oxides, medium brown.		41-1	ML		11.8		Clay % = 17, Silt % = 49, Sand % = 34		
2		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		41-2	CL		13.1				
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.5m slotted. Dry upon completion.									
		Water Levels: March 07, 2008 - Dry to 2.92m April 02, 2008 - Dry to 2.92m									
4											
5											
6											
7											
8											
9											
10											

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

McIntosh Lalani Engineering
Calgary, AB
(403) 291-2345

Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: m	Page 1 of 1

APPENDIX B

DESIGN AND CONSTRUCTION GUIDELINES

BACKFILL MATERIALS AND COMPACTION

Maximum density, as used in this section, means Standard Proctor Maximum Dry Density (ASTM Test D698) unless specified noted otherwise. Optimum moisture content is as defined in this text.

"General engineered fill" materials should comprise clean, well-graded granular soils or inorganic, low-plastic cohesive soils. Such material should be placed in compacted lifts not exceeding 200 mm and compacted to not less than 98 percent of maximum density, at a moisture content at or slightly above optimum.

"Structural fill" materials should comprise clean, well-graded inorganic granular soils. Such fill should be placed in compacted lifts not exceeding 150 mm and compacted to not less than 98 percent of maximum density, at a moisture content at or slightly (0 to 3 percent) above optimum.

"Landscape fill" material may comprise soils without regard to engineering quality. Such soils should be placed in compacted lifts not exceeding 300 mm and compacted to a density of not less than 90 percent of maximum density.

Backfill adjacent to and above footings, abutment walls, basement walls, grade beams and pile caps or below highway, street or parking lot pavement sections should comprise general engineered fill materials as defined above.

Backfill supporting structural loads should comprise structural fill materials as defined above.

Backfill adjacent to exterior footings, foundation walls, grade beams and pile caps and within 300 mm of final grade should comprise low-plastic cohesive general engineered fill as defined above. Such backfill should provide a relatively impervious surface layer to reduce seepage in the sub-soil.

Backfill should not be placed against a foundation structure until the structure has sufficient strength to withstand the earth pressures resulting from placement and compaction. During compaction, careful observation of the foundation wall for deflection should be carried out continuously. Where deflection is apparent, the compactive effort should be reduced accordingly. In order to reduce potential compaction induced stresses, only hand held compaction equipment should be used in the compaction of fill within 500 mm of retaining walls or basement walls.

Backfill materials should not be placed in a frozen state or placed on a frozen subgrade. All lumps of materials should be broken down during placement.

Where the maximum-sized particles in any backfill material exceed 50 percent of the lift thickness or minimum dimension of the cross-section to be backfilled, such particles should be removed and placed at other more suitable locations on site or screened-off to delivery to site.

Bonding should be provided between backfill lifts, if the previous life has become desiccated. For fine-grained materials, the previous lift should be scarified to 75 mm in depth followed by proper moisture conditioning and recompaction.

Recommendations for the specifications for various backfill types are presented below.

"Clean, well-graded inorganic granular soils" should conform to the following grading:

SIEVE SIZES (SQUARE OPENINGS)	PERCENT PASSING BY WEIGHT
200 mm	100 of Total Sample
150 mm	96 - 100 of Total Sample
75 mm	60 - 80 of Total Sample
25 mm	70 - 100 of Material Passing 75 mm Sieve
4.75 mm	25 - 63 of Material Passing 75 mm Sieve
1.18 mm	14 - 41 of Material Passing 75 mm Sieve
0.60 mm	7 - 30 of Material Passing 75 mm Sieve
0.15 mm	3 - 18 of Material Passing 75 mm Sieve
0.075 mm	2 - 9 of Material Passing 75 mm Sieve

Any grading variation from the above should be at the discretion of the Engineer; however, the percent of material passing the 0.075 mm sieve size should not exceed ⅔ of the material passing the 0.6 mm sieve. The pit-run gravel should be free of any form of coating and any gravel containing clay, loam or other deleterious materials should be rejected. No oversized material should be tolerated.

"Crushed gravel", should conform to the following grading:

PERCENT PASSING BY WEIGHT
NOMINAL GRAVEL SIZE

SIEVE SIZES (SQUARE OPENINGS)	100 mm	50 mm	25 mm
100 mm	100	---	---
75 mm	90 - 100	---	---
50 mm	---	100	---
40 mm	60 - 80	90 - 100	---
25 mm	---	---	100
20 mm	40 - 66	50 - 75	95 - 100
10 mm	25 - 54	25 - 52	60 - 80
4.75 mm	15 - 43	15 - 40	40 - 60
2.36 mm	10 - 35	10 - 33	28 - 48
0.60 mm	5 - 23	5 - 23	13 - 29
0.30 mm	---	---	9 - 21
0.15 mm	3 - 12	2 - 14	6 - 15
0.075 mm	2 - 10	1 - 10	4 - 10

Gravel:

100 mm Crushed Gravel: At least 13 percent by weight of the material retained on the 4.75 mm sieve should have two more fractured faces.

50 mm Crushed Gravel: At least 13 percent by weight of the material retained on the 4.75 mm sieve should have two more fractured faces.

25 mm Crushed Gravel: At least 50 percent by weight of the material retained on the 4.75 mm sieve should have two more fractured faces.

Any gravel containing deleterious material should be rejected.

"Coarse gravel" for bedding and drainage should conform to the following grading:

	PERCENT PASSING BY WEIGHT (NOMINAL GRAVEL SIZE)	
SIEVE SIZES (SQUARE OPENINGS)	50 mm	40 mm
50 mm	100	---
40 mm	90 - 100	100
25 mm	---	95 - 100
20 mm	35 - 70	---
15 mm	---	25 - 60
10 mm	10 - 30	---
4.75 mm	0 - 5	0 - 10
2.36 mm	---	0 - 5

"Coarse sand" for bedding and drainage should conform to the following grading:

SIEVE SIZES (SQUARE OPENINGS)	PERCENT PASSING BY WEIGHT
10 mm	100
4.75 mm	95 - 100
2.36 mm	80 - 100
1.18 mm	50 - 85
0.60 mm	25 - 60
0.30 mm	10 - 30
0.15 mm	2 - 10

"Lean-mix concrete" should be low strength concrete having a minimum 28 days compressive strength of 3.5 MPa.

CONSTRUCTION EXCAVATIONS

Construction should be in accordance with good practice and comply with the requirements of the responsible agencies.

All excavations greater than 1.5 m deep should be sloped or shored for work protection.

Shallow excavations up to 3 m depth may use temporary side slopes of 1H:1V. A flatter slope of 2H:1V should be used if groundwater is encountered. Localized sloughing can be expected from these slopes.

Deep excavations or trenches may require temporary support if space limitations or economic considerations preclude the use of sloped excavations.

For excavations greater than 3 m depth, temporary support should be designed by a qualified geotechnical engineer. The design and proposed installation and construction procedures should be submitted to McIntosh•Lalani Engineering Ltd. for review.

The construction of a temporary support system should be monitored. Detailed records should be taken of installation methods, materials, in situ conditions and the movement of the system. If anchors are used, they should be load tested. McIntosh•Lalani Engineering Ltd. can provide further information on monitoring and testing procedures, if required.

Attention should be paid to structures or buried service lines close to the excavation. For structures, a general guideline is that if a line projected down at 45^0 from a horizontal, from the base of foundations of adjacent structures, intersects the extent of the proposed excavation, then these structures may require underpinning or special shoring techniques to avoid damaging earth movements. The need for any underpinning or special shoring techniques and the scope of monitoring required can be determined when details of the service ducts and vaults, foundation configuration of existing buildings and final design excavation levels are known.

No surface surcharges should be placed closer to the edge of the excavation than a distance equal to the depth of the excavation, unless the excavation support system has been designed to accommodate such surcharge.

SHALLOW FOUNDATIONS

Design and construction of shallow foundations should comply with relevant Building Code requirements.

The term "shallow foundations" includes strip and spread footings, mat slab and raft foundations.

Minimum footing dimensions in plan should be 0.45 m and 0.9 m for strip and square footings, respectively.

No loose, disturbed or sloughed material should be allowed to remain in open foundation excavations. Hand cleaning should be undertaken to prepare an acceptable bearing surface. Recompaction of disturbed or loosened bearing surface may be required.

Foundation excavation and bearing surfaces should be protected from rain, snow, freezing temperatures, drying and the ingress of free water, during and after footing construction.

Footing excavations should be carried down into the designated bearing stratum.

After the bearing surface is approved, a mud slab should be poured to protect the soil and provide a working surface for construction, should immediate foundation construction not be intended.

All constructed foundations should be placed on unfrozen soils, which should be at all times protected from frost penetration.

All foundation excavations and bearing surface should be observed by a qualified geotechnical engineer to confirm that the recommendations contained in this report have been followed and that soil conditions are consistent with those assumed in the design.

Where over-excavation has been carried out through a weak or unsuitable stratum to reach into a suitable bearing stratum or where a foundation pad is to be placed above stripped natural ground surface, such over-excavation may be backfilled to subgrade elevation utilizing either structural fill or lean-mix concrete. These materials are defined under the separate heading "Backfill Materials and Compaction."

APPENDIX F2

2024 Watt –

Geotechnical Report

Bifröst

Environmental and Remediation Services Inc.

NETOOK CROSSING

Geotechnical Assessment

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Prepared For: B & A Planning Group
Date: 2024-03-19
Our File No.: 3903.T01

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1.0 INTRODUCTION

Watt Consulting Group (WATT) was retained by B&A Planning Group to complete a geotechnical assessment to support development within the Netook Crossing subdivision. The objective of the geotechnical assessment was to determine the subsurface ground and groundwater conditions at the project site, and to provide geotechnical comments and recommendations pertinent to project design and construction.

2.0 PROJECT BACKGROUND

The project site is located east of Olds, Alberta, North of Highway 27, West of Range Road 12, and South of the Olds Golf Club. The site is a currently undeveloped quarter section, used for agriculture activities.

Based on a review of published geological data and our local experience, the subsurface ground conditions at the project site are anticipated to comprise of clay till, underlain by completely to highly weathered bedrock.

A geotechnical investigation is required to support development and building permit applications, and to provide comments and recommendations for foundation design and other development features.

3.0 GEOTECHNICAL INVESTIGATION

3.1 Investigation Methodology

During a previous Geotechnical Investigation by MacIntosh Lalani in 2008, nine boreholes were drilled within the project area. To comply with the County spacing requirements, an additional twenty seven boreholes were completed, representing a total of thirty six boreholes on the subject property. On December 1 and 2, 2023, WATT staff oversaw the drilling of twenty seven geotechnical boreholes at the approximate locations shown on Figure 1 – Borehole Location Plan, attached in Appendix A. Borehole locations were selected based on site access and locations of underground and overhead utilities at time of drilling. Drilling was carried out by Venom Drilling of Blackfalds, Alberta, using a truck mounted solid stem auger drill rig. All boreholes were advanced to the design depth of 6 meters below ground surface (mbgs), with the exception of BH23-04 which reached early refusal. Standard penetration Tests (SPTs) were completed at select intervals, and soil samples were taken from the split spoon sampler and from the auger flight.

The subsurface ground and groundwater conditions were logged in the field by WATT staff as drilling proceeded. The subsurface stratigraphy encountered is shown on the

Borehole Records attached in Appendix B. 25 mm diameter standpipe piezometers were installed in each of the boreholes.

Soil samples obtained during drilling were submitted to Solum Consultants Ltd. Geotechnical and Materials Testing Laboratory in Calgary, Alberta. The following soil index tests were completed on select soil samples:

- Moisture content determination (ASTM D2216) – 159 tests;
- Particle size analysis (ASTM D422) – 5 tests;
- Atterberg limits (ASTM D4318) – 6 tests;
- Water soluble sulphate concentrations (CSA A23.1) – 4 tests; and
- California Bearing Ratio (CBR) – 1 test.

The soils laboratory test results are shown on the Borehole Records, are attached in Appendix C, and are discussed in Section 3.2.

3.2 Subsurface Ground Conditions

The subsurface stratigraphy encountered at the discrete borehole locations generally comprised of topsoil and fill, underlain by silty clay till and completely to highly weathered bedrock. The Borehole Records attached to this report present WATT's interpretation of the materials encountered. It is noted that the subsurface stratigraphy may be variable between borehole locations. A description of the subsurface soil strata encountered is provided in the following sections.

3.2.1 Topsoil

Topsoil was encountered in all 27 holes, ranging in depth from 0.2 to 0.3 metres.

3.2.2 Silty Clay Till

Silty clay till was the predominant material encountered in all boreholes. The till was light brown to grey in color, contained some sand and trace gravel. Field records indicate the silty clay is low to medium plasticity and was damp to moist. Oxidized stains were observed at variable depths, indicating groundwater influence or infiltration of surface water.

SPTs completed within the silty clay till stratum resulted in N-values ranging from 7 to 32 blows per 300 mm of penetration, indicating the material is firm to hard. Moisture content tests completed within the silty clay till ranged from 9% to 19%, indicating damp to wet sample conditions. A summary of particle size distribution and Atterberg Limits Test (plasticity) are shown below:

Table 1: Soils Index Test Results – Silty Clay Till

Borehole ID	Depth (m)	Atterberg Limits			Particle Size			
		Liquid Limit	Plastic Limit	Plasticity Index	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH23-03	2.0	26	17	9	-	-	-	-
BH23-04	2.0	32	17	15	-	-	-	-
BH23-06	2.0	38	15	23				
BH23-08	3.0	-	-	-	0	34	48	18
BH23-11	2.0	37	15	22				
BH23-11	3.0	-	-	-	2	31	47	21
BH23-15	2.0	34	14	20	-	-	-	-
BH23-16	1.0	-	-	-	2	36	41	21
BH23-18	2.0	-	-	-	0	32	42	26
BH23-19	2.0	34	14	20	-	-	-	-
BH23-24	3.0	-	-	-	1	34	42	24

3.2.3 Silty Sand (Completely Weathered Bedrock)

Silty sand was observed in 12 of the 27 boreholes, typically underlying the topsoil. The silty sand was noted to contain traces of clay and gravel and described as light brown, still and low plasticity.

Three SPTs completed within the silty sand stratum resulted in N-values ranging from 10 to 13 blows per 150 mm, indicating the material is stiff. Moisture content tests completed on SPT and auger samples ranged from 9% to 13%, indicating dry to damp sample conditions.

3.3 Subsurface Groundwater Conditions

During the subsurface investigation on December 1 and 2, 2023, standpipe piezometers were installed in each borehole to monitor groundwater levels. The piezometers were subsequently damaged and unable to be read. To allow determination of the stabilized groundwater elevation, the 27 piezometers were re-installed on February 8, 2024.

Very little groundwater seepage was observed in all boreholes and each borehole was noted to be dry upon the completion of drilling. It should be recognized that groundwater levels vary seasonally and from year to year, and are dependent on many factors including surface drainage, precipitation and the hydrology of the area. Groundwater conditions may also change over time due to site development, such as new building construction or site re-grading.

The installed standpipes will continue to be read to determine the stabilized groundwater elevation and a follow-up report with this information will be provided. For preliminary purposes, the coefficient of permeability of the silty clay till may be taken as $k \sim 1*10^{-7}$ m/s.

Since standpipe piezometers were re-installed on February 8, 2024, they have continued to be read frequently to determine the groundwater elevation at each location. The below table summarizes the groundwater readings to date, indicating the highest groundwater recorded and corresponding elevation for each borehole:

Table 2: Water Level Readings – Summary to Date

Borehole ID	Surface Elevation (masl)	Highest Depth to Water Recorded (m)	Maximum Groundwater Elevation (masl)
BH23-01	1018.8	2.5	1016.3
BH23-02	1019.0	2.7	1016.3
BH23-03	1019.3	4.4	1014.9
BH23-04	1018.3	2.0	1016.3
BH23-05	1020.3	Dry	N/A
BH23-06	1018.6	3.1	1015.5
BH23-07	1018.5	3.5	1015.0
BH23-08	1018.1	2.2	1015.9

Borehole ID	Surface Elevation (masl)	Highest Depth to Water Recorded (m)	Maximum Groundwater Elevation (masl)
BH23-09	1019.4	Dry	N/A
BH23-10	1019.6	4.1	1015.5
BH23-11	1019.5	4.4	1015.1
BH23-12	1018.9	Dry	N/A
BH23-13	1018.7	4.6	1014.1
BH23-14	1020.4	Dry	N/A
BH23-15	1019.5	Dry	N/A
BH23-16	1019.6	5.6	1014.0
BH23-17	1018.8	Dry	N/A
BH23-18	1019.5	Dry	N/A
BH23-19	1018.3	3.9	1014.4
BH23-20	1019.9	5.0	1014.9
BH23-21	1019.4	5.0	1014.4
BH23-22	1018.2	Dry	N/A
BH23-23	1018.9	Dry	N/A
BH23-24	1019.3	Dry	N/A
BH23-25	1018.5	4.7	1013.8
BH23-26	1018.0	Dry	N/A
BH23-27	1019.0	Dry	N/A

4.0 GEOTECHNICAL COMMENTS AND RECOMMENDATIONS

4.1 General Geotechnical Commentary

Design and construction recommendations pertaining to the geotechnical aspects of the proposed development are provided in this report section based on the results of the geotechnical evaluation fieldwork, the laboratory testing carried out, and WATT's understanding of the proposed development at time of report preparation. These recommendations are intended to provide support for various project concepts and specifications as well as insight to determine the most appropriate site-specific construction methodologies. As well, WATT should be retained to review applicable geotechnical aspects of the final design (drawings and specifications) and provide all necessary field reviews.

The subsurface ground and groundwater conditions encountered at the project site are considered suitable for the proposed development. Geotechnical considerations for the project site are summarized as follows:

- Competent foundation materials in form of silty clay till were encountered at the project site. The materials are suitable to support shallow foundations in form of spread and strip footings.
- Discussions and recommendations regarding groundwater will be provided in the follow-up report once stabilized groundwater elevations are available.

Detailed design and construction comments and recommendations for the proposed development are provided in the following Sections.

4.2 Site Preparation

All deleterious material such as, but not limited to, surface vegetation and organic soils as well as all fill soils should be sub-excavated to competent, minimum stiff silty clay till subgrade material.

Prior to any development activities, all exposed subgrade surfaces subject to site development should be proof-rolled using heavy equipment such as a loaded tandem dump truck. All loose or soft areas must be sub-excavated to competent material and replaced with approved engineered fill. Further recommendations for backfill materials (types, re-use of site soils) and compaction requirements are provided in Section 4.3. The final subgrade surface should be carefully graded to prevent ponding and to direct water away from the building area.



It is recommended to carry out construction during the spring, summer and fall months. If construction is carried out during winter conditions, the subgrade should be protected from freezing. In addition, the subgrade should be protected from wetting or drying, both before and after the placement of engineered fill, granular base material, or concrete. Subgrade surfaces that are allowed to dry or become wet should be scarified, moisture conditioned, and re-compacted.

4.3 Backfill and Compaction

The native silty clay till soils encountered at the project site are generally suitable for re-use as engineered fill. All engineered fill should be placed in lifts not exceeding 200 mm thickness (loose measure) and should be compacted to minimum 98% of Standard Proctor maximum dry density (SPMDD), at a moisture content of 0 to +2% of its optimum moisture content (OMC) for compaction purposes. The maximum lift thickness may vary depending on the compaction equipment used and should be verified through field density testing at time of construction. It is noted that underlying completely weathered silty sand bedrock is likely not suitable for re-use as engineered fill, due to the high silt content and associated difficulty to achieve optimum moisture content for compaction purposes.

Structural fill should comprise of well graded, 25 mm minus crushed gravel. It should be placed in lifts not exceeding 200 mm thickness (loose measure) and should be compacted to minimum 100% of SPMDD, at a moisture content of ±3% of OMC.

All fill must be free from topsoil, organics, fill and otherwise deleterious material, and must not be frozen at time of placement.

4.4 Strip and Spread Footings

This Section provides geotechnical design parameters in Limit States Design format as per National Building Code of Canada – 2019 Alberta Edition. As outlined above, conventional spread and strip footings are considered suitable for the proposed building. It is anticipated that footings will be within the silty clay till material.

The following geotechnical foundation design recommendations are based on the foundation dimensions ranging from 0.5 to 2.0 m widths, and a minimum embedment depth of 0.5 m below ground level (measured from ground surface or top of slab-on-grade, whichever is less). Increased embedment depths will be needed to provide adequate soil cover for frost protection purposes (see Section 4.8).

Values for the factored Ultimate Limit States (ULS) and Serviceability Limit States (SLS) geotechnical bearing resistances for bearing capacities for shallow foundations with



above noted dimensions may be taken as 250 kPa and 150 kPa respectively. A resistance factor of 0.5 as per Canadian Building Code has been applied to determine the factored bearing resistance at ULS conditions. SLS bearing capacities were determined based on typical tolerable total and differential settlement of 25 mm and 20 mm, respectively.

For larger footings, the geotechnical bearing resistance would generally increase. However, settlement of the footings would also increase and add to the high risk of excessive total and differential settlement for the building structure. WATT would be pleased to complete additional analysis and provide further geotechnical input should footings with more than 2.0 m width be required.

The values presented above are for vertical, concentric loading, as described in the CFEM (2006). For footings subjected to eccentric loads, the following equivalent footing width should be used to calculate the bearing pressure of the footing:

$$B' = B - 2e$$

$$L' = L - 2e$$

Where B' is the equivalent footing width; B is the actual footing width; L' is the equivalent footing length, L is the actual footing length, and e is the eccentricity of the load. Effects of inclined loads, if any, should also be considered as discussed in the CFEM (2006).

The subgrade surfaces beneath building foundations must be free from frozen, loose or soft materials. The base of all footings must be inspected by qualified geotechnical personnel prior to placing concrete to confirm the above design bearing pressures and to ensure there are no disturbances or deleterious materials present.

4.5 Non-Structural Floor Slabs-on-Grade

Non-structural cast-in-place concrete slabs-on-grade, placed on approved subgrade soils, are typically used as floor systems. A 150 mm thick levelling course comprising of 25 mm minus crushed gravel (similar to structural fill, see Section 4.3) should be placed below non-structural slab-on-grades. The crushed gravel levelling course should be placed within ±3% of its optimum moisture content for compaction purposes (OMC) and compacted to minimum 100% of its Standard Proctor maximum dry density (SPMDD). It is recommended to place a non-woven geotextile separation membrane between cohesive engineered fill and granular fill.

Vertical differential movements between non-structural floor slabs-on-grade and structural building elements are inevitable and considered to be acceptable as per the current standard of practice. Slabs should float on the subgrade and only be tied into the foundation walls or grade beams at doorways. To reduce the effects of vertical slab

movement (e.g. potential slab cracking, partition wall distortion, cracking of brittle finishing surfaces), the following provisions should be implemented to allow the slab to move independently of the structural components of the building:

- Partition and non-bearing walls should not be rigidly connected to bearing walls or columns;
- Reinforce the concrete and articulate the slab at regular intervals to control cracking;
- Heating ducts placed beneath the floor slab should be insulated to minimize drying and shrinkage of clay fill/till soils; and
- Piping and electrical conduits should permit flexibility and some movement.

Non-structural slabs-on-grade supported by fill (i.e. backfill placed surrounding basement walls) are not recommended as consolidation settlement of fill may occur. These areas should be design as suspended slabs, supported by basement walls and surrounding footings.

It is noted that the basement floor slab may also be designed as a structural (raft) slab-on-grade, which would reduce effort for detail footing excavations underneath a non-structural slab-on grade. WATT would be pleased to provide parameters for raft foundation design should this option be considered for this project.

4.6 Lateral Earth Pressures

Lateral pressures are to be considered acting on below-grade building perimeter walls. The earth pressures will be induced by new fill placed within basement excavation, which is anticipated to comprise of local silty clay till, or imported soil of similar nature.

Active earth pressure conditions should be used in establishing earth pressures acting on the underground structure walls. The lateral pressure applied to subgrade walls is calculated using the following formula:

$$P = K\ (\gamma bH + q)$$

Where:

P = lateral earth pressure (kPa)

K = earth pressure coefficient

γ_b = soil unit weight

H = Height of wall (m)

q = surcharge load (if applicable)



An earth pressure coefficient of K_a = 0.40 may be used for active earth pressure conditions. The soil unit weights for the re-worked silty clay till may be taken as 19 kN/m^3 above the groundwater table.

The equation for lateral earth pressure assumes a horizontal ground surface behind the buried wall. If the ground surface slopes away from the wall, design pressure should be re-evaluated. Hydrostatic pressures acting on below grade walls may also be considered in design, depending on the selected waterproofing/dewatering method (see Section **Error! Reference source not found.**).

4.7 Seismic Considerations

Seismic design for residential structures is based on the National Building Code of Canada (NBCC). The primary objective of the NBCC earthquake resistant design requirements is to protect the life and safety of the building occupants as the building responds to strong ground shaking. Structures designed in conformance with the NBCC provisions may undergo extensive structural damage during strong ground shaking but should not collapse. Collapse is defined to be a state where occupants can no longer exit the building because of structural failure. This implies that supporting foundations necessary to ensure the building's post-earthquake stability must be protected against excessive movement under strong ground shaking.

Based on the results of the field investigation, it is appropriate to classify the ground conditions at the project site as a Class C Site for seismic site response. Liquefaction of the silty clay till soils or completely to highly weathered bedrock encountered at the project site is unlikely.

4.8 Frost Protection

Minimum soil cover of 1.5 and 2.0 m should be provided for heated and unheated structures, respectively. Alternatively, rigid insulation may be used to provide equivalent frost protection. Grade beams that do not have adequate soil cover for frost protection should be constructed with a minimum 100 mm void space below the grade beam. It is noted that the frost penetration depths provided above are based on the native, cohesive soils at the project site. Greater frost depths are to be considered if native materials are being replaced, e.g. if granular fill is used to backfill temporary excavations or utility trenches.

Concrete flatwork should be designed with anticipation of some frost heave occurring. Concrete sidewalks should be dowelled into footings or grade beams in threshold areas where heave of concrete panels would obstruct the proper opening of doors and present tripping hazards. As the outside of edge of these panels will still heave, the panel should

either be properly jointed to control crack locations or reinforced by placement of adequate reinforcing steel. Alternatively, rigid insulation may be placed below flatwork to prevent frost formation in the underlying subgrade. WATT can provide detailed recommendations for such insulation if required.

4.9 Temporary Excavation and Dewatering

Temporary excavations (estimated duration of less than 6 months) will be required to construct the basement and for utility trenches. The excavations for this project site are anticipated to be primarily within native silty clay till soil.

All excavations should follow Alberta Occupational Health and Safety Code Standards, Chapter 32 “Excavation and Tunneling”. The subsurface soils encountered at the project site are to be classified as “likely to crack or crumble soil”. Excavations of up to 1.5 m depth may be cut vertically into the soil strata. Excavations with greater depth may be sloped to within 1.5 m of the bottom of the excavation at an angle of not less than 45º measured from the vertical. It is anticipated that excavation depths will not exceed approximately 4.0 mbgs. Excavations of greater depth should be subject to a slope stability assessment.

Seepage into the excavation at the project site may occur, depending on the groundwater conditions encountered during construction. Although the boreholes were noted to be dry during drilling, the stabilized groundwater elevation may help to determine the risk of seepage during excavations.

Due to the fine-grained nature of the water bearing ground stratum, temporary excavation side slopes may not be stable without prior lowering of the groundwater level. A suitable dewatering method for the subsurface ground conditions at the project site comprises of a series of vacuum-assisted wellpoints. The wellpoint system should be designed by a qualified dewatering designer/contractor, who may also provide dewatering alternatives based on local experience.

Prior to allowing workers to enter the construction excavations, a thorough inspection should be undertaken for evidence of instability (cracks, bulging, sloughing, seepage, or else). Any loose/unstable soils or cobbles should be scaled from the excavations prior to worker entry. All unsupported excavations should be monitored on a daily basis for evidence of slope movements such as slumping, bulging, or else. Any such movements should be reported to WATT and remedial stability measures undertaken immediately.

Stockpiles of construction materials, excavated soil, construction equipment, or traffic should be kept away from the slope crest/edge by a distance equal to the depth of excavation. The vibration created from heavy machinery operations or compaction

processes can destabilize a slope; hence, use of heavy machinery within close proximity to excavated slopes should be minimized.

Temporary shoring will be required if the aforementioned excavation geometry cannot be facilitated, or deeper excavations are required for construction aspects. A qualified shoring consultant/contractor should be retained to design a suitable shoring system for the project site, if required.

4.10 Site Grading and Drainage

To provide proper drainage for the proposed development and to direct surface water to areas away from proposed structures, final site landscaping grades should be sloped away from building perimeter walls to mitigate the potential of surficial water ponding in localized areas adjacent to structures. Minimum final site grades draining away from building structures of 1.0% in paved areas, 1.5% in non-paved areas, and 3.0% within 2.0 m laterally of structures adjacent to landscaped areas are recommended.

All downspouts should be directed away from the building structure to a site gradient that promotes positive surficial drainage away from the attached building. Downspouts should not be directed into the perimeter drain or weeping tile system (if constructed).

4.11 Pavement Design Considerations

Recommendations for asphaltic concrete structures placed on suitably prepared subgrade soils as outlined in Section 4.2 are provided in the following table:

Table 3: Recommended Asphaltic Concrete Pavement Structure

Material	Minimum Design Thickness (mm)			
	Paved Lane	Residential Local		Residential Collector
Asphalt Concrete	75	75*	90	100
25 mm Crushed Gravel Base	100	150	150	175
80 mm Crushed Granular Subbase	300	300	200	300

*Red Deer County Specifications require a minimum depth of asphaltic concrete on local roads and primary access lanes with deep utility services of 90mm.

Minimum thicknesses have been designed based on a soaked CBR of 3.1%.

All materials used to construct asphaltic concrete pavement structures should comply with the Mountain View County Standard Specifications (current edition). Test results verifying materials properties should be provided to WATT to confirm compliance with the specifications prior to use and placement on site.

4.12 Concrete Exposure Class

Four sulphate (SO_4) in groundwater samples, mg/L resulted in sulphate concentrations ranging from 521 to 918 mg/L. The test result indicated negligible exposure to concrete in contact with the subsurface soils. Accordingly, concrete placed in contact with the soil can comprise of Type GU cement. In addition, all concrete must be designed in accordance with CSA A23.1-04 i.e. air-entraining agents are required in freeze/thaw zones. Any imported fill to be placed in contact with concrete should also be tested for water-soluble sulphate content and the above recommendations re-evaluated.

4.13 Review, Testing and Field Inspection

WATT should be given the opportunity to review details of the design and specifications related to geotechnical aspects of this project prior to construction. The recommendations provided in this report should be supported by an adequate scope of field review during construction. All construction should be undertaken by an experienced contractor for the foundation and earthworks construction. As a minimum, an adequate scope of field review is as follows:

- Shallow Foundations → Observation of all bearing surfaces prior to fill or concrete placement;
- Floor Slab-on-Grades → Observation of all subgrades prior to fill or concrete placement;
- Engineered Fill Placement → Full-time monitoring and compaction testing during fill placement;

All geotechnical field reviews must be carried out by a qualified geotechnical engineer or technician independent of the contractor. Failure to provide an adequate level of field review for construction of the foundations may be in contradiction of the Alberta Building Code requirements.

5.0 LIMITATIONS

The recommendations provided in this geotechnical evaluation report are based on the interpreted findings encountered within three (3) geotechnical boreholes drilled across the project site. The subsurface soil and groundwater conditions observed during borehole drilling are anticipated to be reasonably representative of the project site; however, it should be noted that innate variable conditions may be encountered at the time of various construction aspects. WATT should be notified and given the opportunity to re-evaluate current information, if required, should geotechnical conditions other than those reported herein be identified at any stage of development.

This report has been prepared with accepted geotechnical soil and foundation engineering practices/principles for the project details specified within this report. The recommendations presented herein are subject to an adequate level of inspection during construction and any relevant Alberta Building Code requirements, or their validity may be jeopardized. No other warranty is expressed or implied.

6.0 CLOSURE

We trust that the information contained in this report meets your present requirements. Please do not hesitate to contact the undersigned with any questions, or should you require further geotechnical input on this project.

Sincerely,

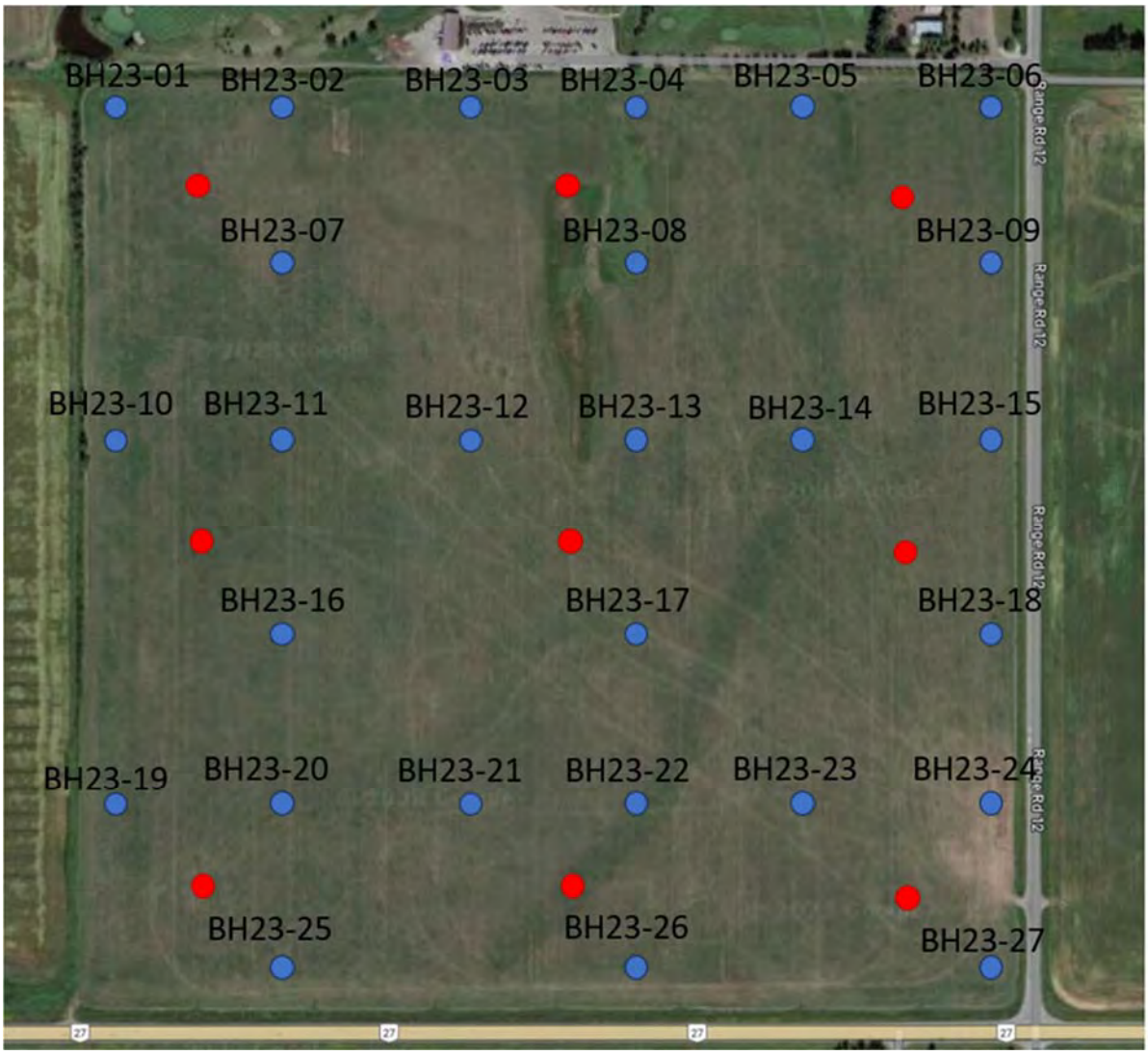
WATT Consulting Group

Joel Rombough, *P.Eng.*

Geotechnical Lead

T 403-462-0718

APPENDIX A:
FIGURE 1 – BOREHOLE LOCATION PLAN



APPENDIX B:
BOREHOLE RECORDS

WELL NUMBER BH23-01

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1018.8 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.50 m / Elev 1016.30 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.25 (OH) Topsoil 1018.55	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 16%	ML		(ML) Silty sand, trace clay and gravel. Brown, damp, compact, low plasticity. 1.50 1017.30	
2	SPT 1	3-5-7 (12)	MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, brown, damp, stiff to very stiff.	
3						3.00 1015.80	
	SPT 2	3-6-9 (15)	MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, light grey, damp, very stiff.	
4			MC = 16%				
5	SPT 3	3-6-11 (17)	MC = 16%				
6							
	SPT 4	3-9-10 (19)	MC = 16%			6.45 1012.35	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-02

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.70 m / Elev 1016.30 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1018.80	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 15%	CL-ML		(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-3-4 (7)	MC = 16%				
3							
4	SPT 2	3-4-6 (10)	MC = 16%				
5	SPT 3	3-6-7 (13)	MC = 14%				
6			MC = 13%				
	SPT 4	3-5-9 (14)	MC = 15%			6.45 1012.55	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-03

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019.3 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.40 m / Elev 1014.90 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1019.10	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 15%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-3-4 (7)	MC = 14%				
3	SPT 2	3-5-7 (12)	MC = 15%				
4			MC = 17%				
5	SPT 3	4-6-9 (15)	MC = 16%				
6	SPT 4	4-6-12 (18)	MC = 16%			6.45 1012.85	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-04

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.3 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.00 m / Elev 1016.30 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1018.05	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff. Auger refusal due to rock or large boulder.	
2	SPT 1	4-6-9 (15)	MC = 17%				
3						3.00 / 1015.30	

Bottom of hole at 3.00 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-05

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1020.3 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
0.25						1020.05	Casing Type: 1" PVC
				CL-ML		(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
1			MC = 14%				
	SPT 1	4-6-8 (14)					
2			MC = 15%				
3							
	SPT 2	5-8-11 (19)	MC = 15%				
4			MC = 15%				
	SPT 3	5-8-10 (18)					
5			MC = 16%				
6							
	SPT 4	5-7-13 (20)	MC = 15%				
6.45						1013.85	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-06

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.6 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 3.10 m / Elev 1015.50 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.30 / 1018.30	Casing Type: 1" PVC
1			MC = 14%			(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	4-7-9 (16)	MC = 16%				
3							
	SPT 2	3-6-7 (13)	MC = 16%	CL-ML			
4			MC = 15%				
5	SPT 3	4-8-15 (23)	MC = 16%				
6							
	SPT 4	5-8-12 (20)	MC = 16%			6.45 / 1012.15	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-07

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1018.5 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 3.50 m / Elev 1015.00 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1018.30	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 16%			(CL-ML) Silty clay till, trace sand. Medium plastic, light brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-4-5 (9)	MC = 16%				
3							
4	SPT 2	3-6-9 (15)	MC = 16%	CL-ML			
5	SPT 3	3-5-7 (12)	MC = 16%				
6							
	SPT 4	3-6-11 (17)	MC = 16%			6.45 1012.05	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-08

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.1 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.20 m / Elev 1015.90 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
0.30						1017.80	Casing Type: 1" PVC
						(CL-ML) Silty clay till, trace sand. Low to medium plastic, dark grey, damp, stiff to very stiff.	
1			MC = 16%				
	SPT 1	3-4-6 (10)					
2			MC = 18%				
3							
	SPT 2	3-5-7 (12)	MC = 17%	CL-ML			
4			MC = 16%				
	SPT 3	4-6-9 (15)					
5			MC = 16%				
6							
	SPT 4	5-8-10 (18)	MC = 16%				
6.45						1011.65	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-09

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019.4 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
0.30						1019.10	Casing Type: 1" PVC
						(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
1			MC = 11%				
2	SPT 1	4-6-9 (15)					
3							
	SPT 2	4-6-10 (16)		CL-ML			
4			MC = 15%				
5	SPT 3	4-8-9 (17)					
			MC = 15%				
6							
	SPT 4	4-8-10 (18)	MC = 16%				
6.45						1012.95	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-10

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019.6 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.10 m / Elev 1015.50 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1019.35	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 10%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-4-7 (11)	MC = 14%				
3							
4	SPT 2	4-6-7 (13)	MC = 12%				
5	SPT 3	3-5-9 (14)	MC = 14%				
6			MC = 13%				
	SPT 4	3-6-11 (17)	MC = 14%			6.45 / 1013.15	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-11

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019.5 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.40 m / Elev 1015.10 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1019.30	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-3-6 (9)	MC = 15%				
3							
	SPT 2	3-5-8 (13)	MC = 16%				
4			MC = 16%				
5	SPT 3	4-5-7 (12)	MC = 16%				
6							
	SPT 4	4-7-10 (17)	MC = 16%			6.45 1013.05	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-12

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1018.9 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1018.70	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 14%			(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-3-4 (7)	MC = 14%				
3							
	SPT 2	3-6-10 (16)	MC = 15%	CL-ML			
4			MC = 15%				
5	SPT 3	4-6-8 (14)	MC = 14%				
6							
	SPT 4	4-8-11 (19)	MC = 14%			6.45 1012.45	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-13

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.7 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.60 m / Elev 1014.10 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
0.25						1018.45	Casing Type: 1" PVC
						(CL-ML) Silty clay till, trace gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
1			MC = 15%				
	SPT 1	3-3-7 (10)					
2			MC = 16%				
3							
	SPT 2	3-5-7 (12)	MC = 16%	CL-ML			
4			MC = 15%				
	SPT 3	4-7-8 (15)					
5			MC = 14%				
6							
	SPT 4	5-8-12 (20)	MC = 16%				
6.45						1012.25	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-14

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1020.4 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1020.20	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 13%	ML		(ML) Silty sand, trace clay and gravel. Brown, damp, compact, low plasticity.	
2	SPT 1	3-4-6 (10)	MC = 12%				
3						3.00 1017.40	
	SPT 2	3-5-7 (12)	MC = 11%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, dark grey, damp, very stiff.	
4			MC = 12%				
5	SPT 3	4-7-9 (16)	MC = 12%				
6							
	SPT 4	5-8-12 (20)	MC = 14%			6.45 1013.95	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-15

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019.5 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.30 / 1019.20	Casing Type: 1" PVC
1			MC = 14%	ML		(ML) Silty sand, trace clay and gravel. Brown, damp, compact, low plasticity.	
	SPT 1	4-8-10 (18)				1.50 / 1018.00	
2			MC = 13%				
3						(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, dark grey, damp, very stiff.	
	SPT 2	3-7-10 (17)	MC = 15%				
4			MC = 14%				
	SPT 3	4-8-9 (17)		CL-ML			
5			MC = 15%				
6							
	SPT 4	5-9-14 (23)	MC = 15%			6.45 / 1013.05	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-16

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019.6 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 5.60 m / Elev 1014.00 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1019.35	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 10%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-5-6 (11)	MC = 13%				
3							
4	SPT 2	3-6-7 (13)	MC = 14%				
5	SPT 3	3-6-11 (17)	MC = 14%				
6							
	SPT 4	3-6-11 (17)	MC = 14%			6.45 / 1013.15	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-17

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.8 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.30 1018.50	Casing Type: 1" PVC
1			MC = 13%	ML		(ML) Silty sand, trace clay and gravel. Brown, damp, compact, low to medium plasticity.	
2	SPT 1	3-6-7 (13)	MC = 15%				
3						3.00 1015.80	
	SPT 2	4-5-8 (13)	MC = 15%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, light grey, damp, very stiff.	
4			MC = 15%				
5	SPT 3	4-8-10 (18)	MC = 14%				
6							
	SPT 4	5-7-12 (19)	MC = 16%			6.45 1012.35	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-18

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019.5 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.30 1019.20	Casing Type: 1" PVC
1			MC = 12%	ML		(ML) Silty sand, trace clay. Brown, damp, stiff, low plasticity.	
						1.50 1018.00	
2	SPT 1	4-8-10 (18)				(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, light grey, damp, very stiff.	
			MC = 14%				
3							
	SPT 2	5-8-9 (17)	MC = 15%				
4			MC = 14%	CL-ML			
	SPT 3	5-8-10 (18)					
5			MC = 15%				
6							
	SPT 4	5-8-11 (19)	MC = 14%			6.45 1013.05	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-19

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1018.3 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 3.90 m / Elev 1014.40 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1018.05	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 15%	ML		(ML) Silty sand, some gravel, trace clay. Brown, damp, compact, low plasticity. 1.50 / 1016.80	
2	SPT 1	4-6-9 (15)	MC = 10%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, light grey, damp, very stiff.	
3							
4	SPT 2	3-5-7 (12)	MC = 11%				
5	SPT 3	3-5-13 (18)	MC = 11%				
6							
	SPT 4	3-6-10 (16)	MC = 14%			6.45 / 1011.85	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-20

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019.9 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 5.00 m / Elev 1014.90 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1019.70	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 9%	ML		(ML) Silty sand, some gravel, trace clay. Brown, damp, compact, low plasticity.	
						1.50 1018.40	
2	SPT 1	3-5-7 (12)	MC = 13%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
3							
4	SPT 2	4-7-9 (16)	MC = 12%				
			MC = 9%				
5	SPT 3	4-8-10 (18)	MC = 9%				
6							
	SPT 4	10-16-16 (32)	MC = 6%			6.45 1013.45	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-21

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019.4 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 5.00 m / Elev 1014.40 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1019.15	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 11%	ML		(ML) Silty sand, some gravel, trace clay. Brown, damp, compact, low plasticity. 1.50 / 1017.90	
2	SPT 1	3-3-7 (10)	MC = 11%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, brown, damp, stiff to very stiff.	
3							
	SPT 2	3-5-11 (16)	MC = 17%				
4			MC = 12%				
	SPT 3	4-6-9 (15)					
5			MC = 13%				
6							
	SPT 4	3-8-11 (19)	MC = 19%			6.45 / 1012.95	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-22

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.2 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
0.25						1017.95	Casing Type: 1" PVC
						(CL-ML) Silty clay till, trace gravel and sand. Medium plastic, brown, damp, stiff to very stiff.	
1			MC = 15%				
	SPT 1	3-4-5 (9)					
2			MC = 16%				
3							
	SPT 2	4-6-7 (13)	MC = 17%	CL-ML			
4			MC = 16%				
	SPT 3	3-5-8 (13)					
5			MC = 14%				
6							
	SPT 4	3-7-8 (15)	MC = 16%				
6.45						1011.75	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-23

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.9 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1018.70	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 12%	ML		(ML) Silty sand, trace clay. Brown, damp, stiff, low plasticity.	
						1.50 1017.40	
2	SPT 1	3-3-7 (10)	MC = 16%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
3							
	SPT 2	3-5-10 (15)	MC = 16%				
4			MC = 16%				
	SPT 3	4-8-9 (17)					
5			MC = 16%				
6							
	SPT 4	5-8-13 (21)	MC = 17%			6.45 1012.45	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-24

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019.3 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1019.05	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 14%	ML		(ML) Silty sand, trace clay. Brown, damp, stiff, low plasticity. 1.50 / 1017.80	
2	SPT 1	4-5-7 (12)	MC = 14%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
3							
	SPT 2	4-6-9 (15)	MC = 15%				
4			MC = 15%				
	SPT 3	5-6-8 (14)					
5			MC = 15%				
6							
	SPT 4	8-8-10 (18)	MC = 15%			6.45 / 1012.85	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-25

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1018.5 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.70 m / Elev 1013.80 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.30 / 1018.20	Casing Type: 1" PVC
1			MC = 13%	CL-ML		(CL-ML) Silty clay till, trace sand. Medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	4-6-8 (14)	MC = 12%				
3							
4	SPT 2	4-5-6 (11)	MC = 15%				
5	SPT 3	3-6-11 (17)	MC = 15%				
6							
	SPT 4	3-6-10 (16)	MC = 15%			6.45 / 1012.05	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-26

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1017.80	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 15%	ML		(ML) Silty sand, trace clay. Brown, damp, loose to compact, low plasticity. 1.50 1016.50	
2	SPT 1	3-4-6 (10)	MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, dark grey, damp, stiff to very stiff.	
3							
	SPT 2	3-5-8 (13)	MC = 16%				
4			MC = 16%				
	SPT 3	4-6-8 (14)					
5			MC = 16%				
6							
	SPT 4	5-8-9 (17)	MC = 16%			6.45 1011.55	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-27

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.25 1018.75	Casing Type: 1" PVC
1			MC = 13%	ML		(ML) Silty sand, trace clay and gravel. Light brown, damp, stiff, low plasticity.	
						1.50 1017.50	
2	SPT 1	3-4-6 (10)	MC = 14%	CL-ML		(CL-ML) Silty clay till, trace sand. Low to medium plastic, dark grey, damp, stiff to very stiff.	
3							
	SPT 2	3-6-8 (14)	MC = 16%				
4			MC = 16%				
	SPT 3	4-7-9 (16)					
5			MC = 16%				
6							
	SPT 4	5-8-11 (19)	MC = 15%			6.45 1012.55	

Bottom of hole at 6.45 m.

APPENDIX C:
LABORATORY TEST RESULTS

Laboratory Analysis Summary Sheet

Project Info: *BNG23*

Client: *Watt Consulting*

** Note: Soil classification is for the whole sample. Soil classification uses the Atterberg Limits results and the percent fines, percent sand and percent gravel as described in ASTM D2487.

Borehole ID	Sample ID	Depth(m)	MC as Received (%)	Particle Size Analysis				
				Cobble Size (%) (75-300mm)	Gravel Size (%) (4.75-75mm)	Sand Size (%) (0.075-4.5mm)	Silt Size (%) (0.002-0.075 mm)	Clay Size (%) (<0.002mm)
BNG23-1088	BH23-16	1.0 m	7.1	0.0	2.4	35.9	40.8	20.9
BNG23-1085	BH23-18	2.0 m	13.5	0.0	0.0	31.9	41.5	26.6
BNG23-1085	BH23-24	3.0 m	11.5	0.0	0.5	33.9	41.8	23.8

Particle Size Analysis
(ASTM D6913 & D7928)

Project Info: *BNG23*

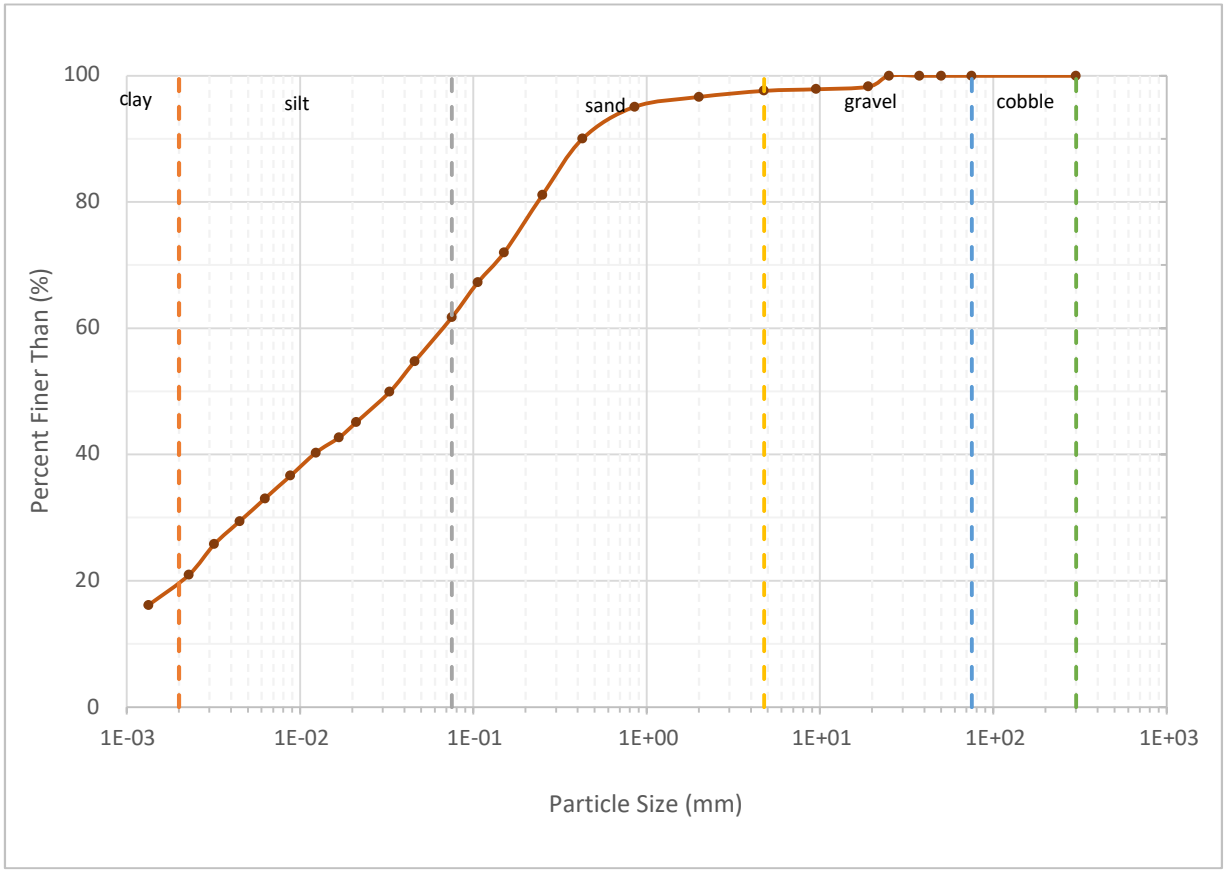
Client: *Watt Consulting*

Sample Info: ***BNG23-1085*** ***BH23-16*** ***1.0 m***

	PARTICLE-SIZE (mm)	PERCENT FINER (%)
GRAVEL	300.000	100.00
	75.000	100.00
	50.000	100.00
	37.500	100.00
	25.000	100.00
	19.000	98.30
	9.500	97.88
	4.750	97.63
SAND	2.000	96.65
	0.850	95.08
	0.425	90.03
	0.250	81.10
	0.150	71.97
	0.106	67.27
	0.075	61.74
HYDROMETER	0.0458	54.76
	0.0329	49.93
	0.0211	45.10
	0.0168	42.69
	0.0123	40.27
	0.0088	36.65
	0.0063	33.03
	0.0045	29.41
	0.0032	25.79
	0.0023	20.96
	0.0013	16.13

Test Results

Cobbles (%) *(75-300mm)*	Gravel (%) *(4.75-75mm)*	Sand (%) *(0.075-4.75mm)*	Silt (%) *0.002-0.075mm*	Clay (%) *<0.002mm*
0.0	**2.4**	**35.9**	**40.8**	**20.9**



Particle Size Analysis
(ASTM D6913 & D7928)

Project Info: *BNG23*

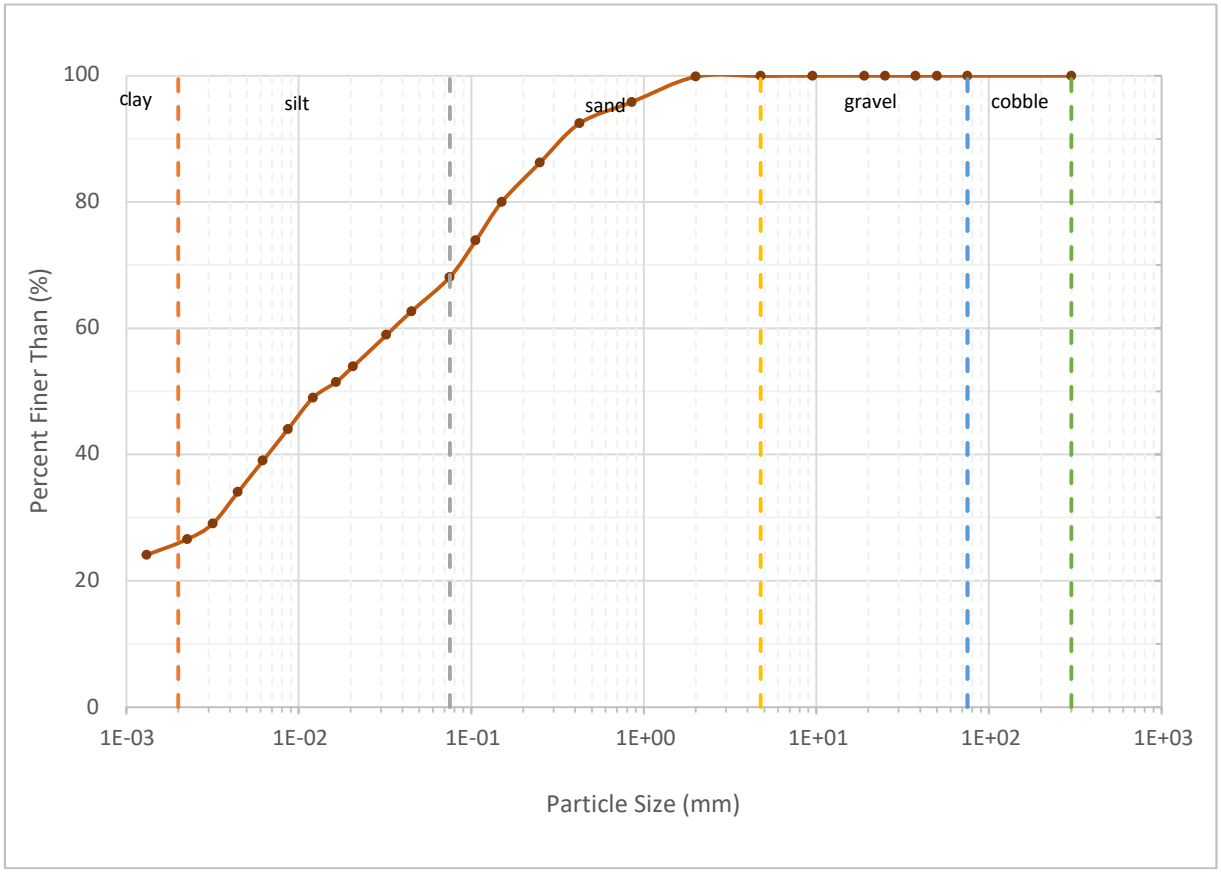
Client: *Watt Consulting*

Sample Info: ***BNG23-1085*** ***BH23-18*** ***2.0 m***

	PARTICLE-SIZE (mm)	PERCENT FINER (%)
GRAVEL	300.000	100.00
	75.000	100.00
	50.000	100.00
	37.500	100.00
	25.000	100.00
	19.000	100.00
	9.500	100.00
	4.750	99.97
SAND	2.000	99.87
	0.850	95.83
	0.425	92.47
	0.250	86.25
	0.150	80.00
	0.106	73.90
	0.075	68.10
HYDROMETER	0.0450	62.68
	0.0322	58.94
	0.0206	53.97
	0.0164	51.48
	0.0121	48.99
	0.0087	44.01
	0.0062	39.03
	0.0044	34.05
	0.0032	29.07
	0.0023	26.58
	0.0013	24.10

Test Results

Cobbles (%) *(75-300mm)*	Gravel (%) *(4.75-75mm)*	Sand (%) *(0.075-4.75mm)*	Silt (%) *0.002-0.075mm*	Clay (%) *<0.002mm*
0.0	**0.0**	**31.9**	**41.5**	**26.6**



Particle Size Analysis
(ASTM D6913 & D7928)

Project Info: *BNG23*

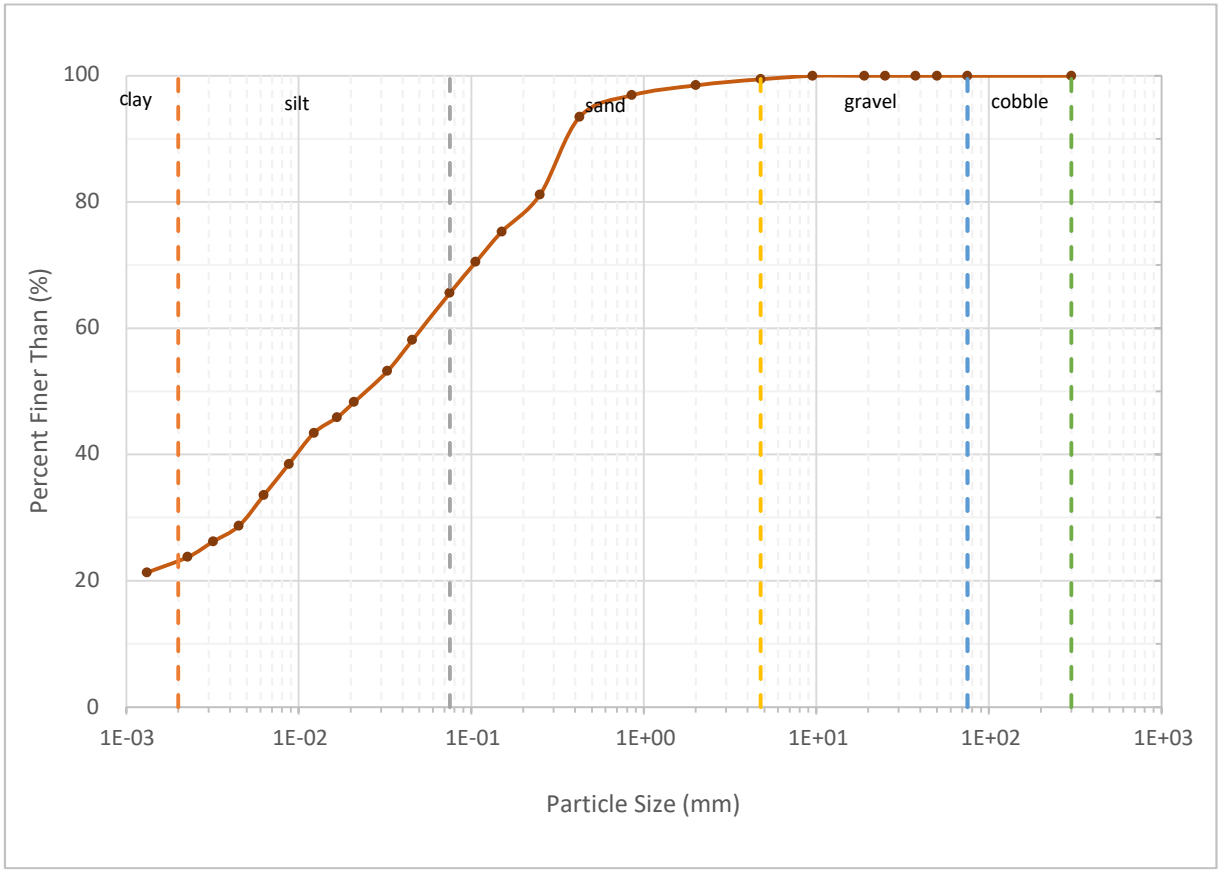
Client: *Watt Consulting*

Sample Info: ***BNG23-1085*** ***BH23-24*** ***3.0 m***

	PARTICLE-SIZE (mm)	PERCENT FINER (%)
GRAVEL	300.000	100.00
	75.000	100.00
	50.000	100.00
	37.500	100.00
	25.000	100.00
	19.000	100.00
	9.500	100.00
	4.750	99.47
SAND	2.000	98.49
	0.850	96.92
	0.425	93.51
	0.250	81.19
	0.150	75.29
	0.106	70.51
	0.075	65.60
HYDROMETER	0.0455	58.13
	0.0326	53.22
	0.0209	48.31
	0.0166	45.86
	0.0122	43.40
	0.0088	38.49
	0.0063	33.58
	0.0045	28.67
	0.0032	26.22
	0.0023	23.76
	0.0013	21.31

Test Results

Cobbles (%) *(75-300mm)*	Gravel (%) *(4.75-75mm)*	Sand (%) *(0.075-4.75mm)*	Silt (%) *0.002-0.075mm*	Clay (%) *<0.002mm*
0.0	**0.5**	**33.9**	**41.8**	**23.8**



HYDROMETER ANALYSIS

AR Geotechnical Engineering Ltd

Lab Technician:	Jemal	**Date:**	Jan 18/2024	
Air Dry weight of Spec. (g):	105	Corrected Sample Wt.		99.8
Specific Gravity(Gs):	2.7	Gs correction factor:		0.99
Composite Correction:	5			
k-factor	0.01312	**CLIENT:**	WATT Consultant	
Hydrometer type:	152 - H	**Sample**	2023-08 @10'	

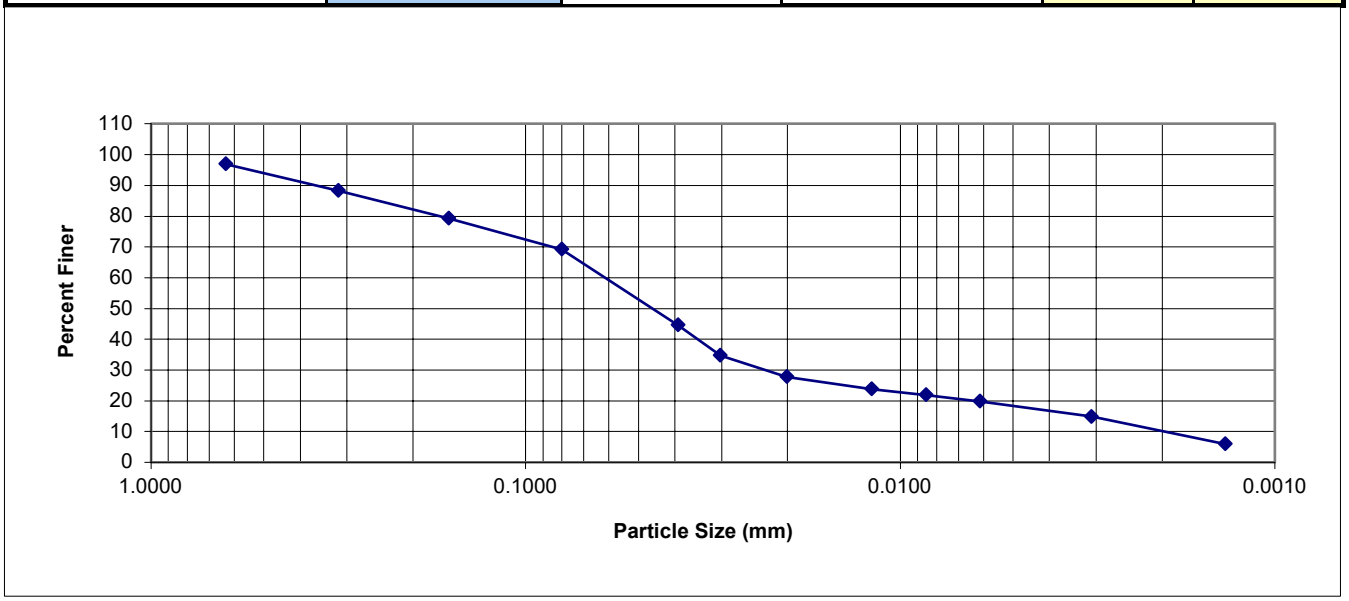
Pan No.:	E
Wt. of Pan + Air Dried (g):	105.3
Wt. of Pan + Oven Dried (g):	100.1
Wt. of Water (g):	5.2
Wt. of Pan (g):	8.2
Wt. of Oven Dried (g):	91.9
Hygroscopic Moisture (%):	5.66

ASTM D422

LIQUID LIMIT	
PLASTIC INDEX	
GRAVEL	0.45
SAND (0.074mm-4.75mm)	34
SILT (0.074mm-0.005mm)	48
CLAY(<0.005mm)	18

Test Data:

Time (1st Four are Sieves) (min)	Hydrometer Reading	Adj. Hydrometer Reading	Effective Depth, L (cm)	Percent Finer	D (mm)
630µm				96.89	0.6300
315µm				88.28	0.3150
160µm				79.26	0.1600
80µm				69.24	0.0800
1	50	45	8.9	44.63	0.0392
2	40	35	10.6	34.71	0.0301
5	33	28	11.7	27.77	0.0201
15	29	24	12.4	23.80	0.0119
30	27	22	12.7	21.82	0.0085
60	25	20	13.0	19.84	0.0061
250	20	15	13.8	14.88	0.0031
1440	11	6	15.3	5.95	0.0014



HYDROMETER ANALYSIS

AR Geotechnical Engineering Ltd

Lab Technician:	Jemal	**Date:**	Jan 18/2024	
Air Dry weight of Spec. (g):	110	Corrected Sample Wt.		104.6
Specific Gravity(Gs):	2.7	Gs correction factor:		0.99
Composite Correction:	5			
k-factor	0.01312	**CLIENT:**	WATT Consultant	
Hydrometer type:	152 - H	**Sample**	2023-11 @10'	

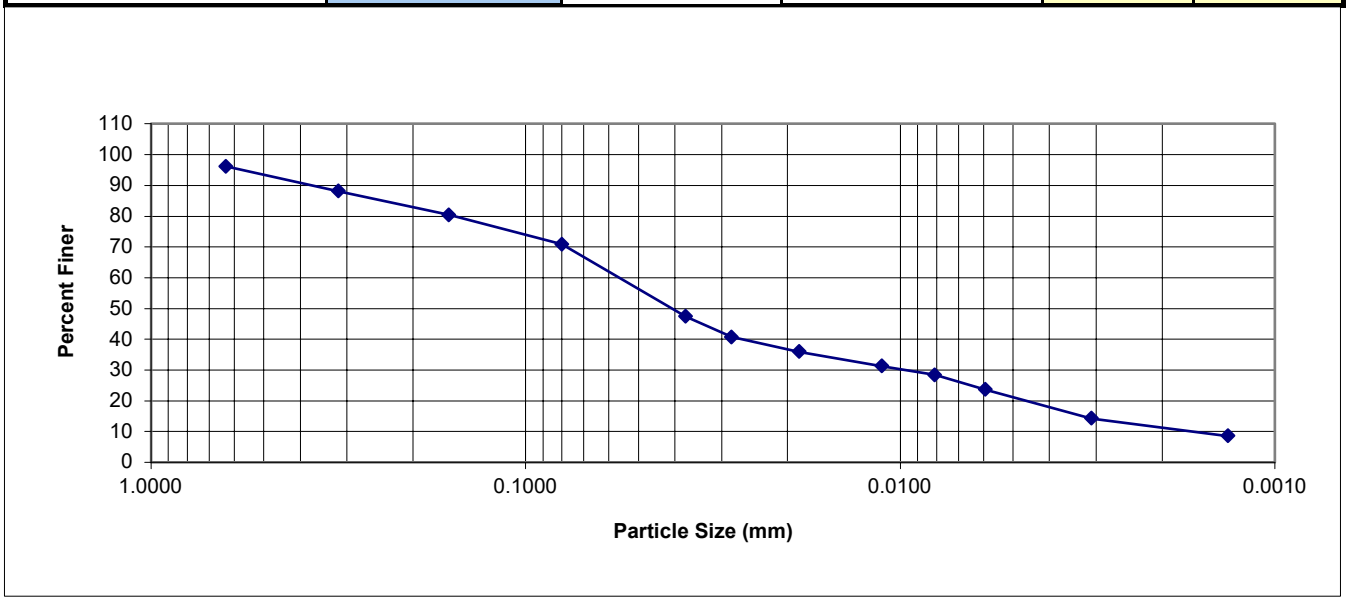
Pan No.:	E
Wt. of Pan + Air Dried (g):	110.3
Wt. of Pan + Oven Dried (g):	104.9
Wt. of Water (g):	5.4
Wt. of Pan (g):	8.2
Wt. of Oven Dried (g):	96.7
Hygroscopic Moisture (%):	5.58

ASTM D422

LIQUID LIMIT	
PLASTIC INDEX	
GRAVEL	1.5
SAND (0.074mm-4.75mm)	31
SILT (0.074mm-0.005mm)	47
CLAY(<0.005mm)	21

Test Data:

Time (1st Four are Sieves) (min)	Hydrometer Reading	Adj. Hydrometer Reading	Effective Depth, L (cm)	Percent Finer	D (mm)
630µm				96.18	0.6300
315µm				88.05	0.3150
160µm				80.40	0.1600
80µm				70.85	0.0800
1	55	50	8.1	47.32	0.0373
2	48	43	9.2	40.69	0.0282
5	43	38	10.1	35.96	0.0186
15	38	33	10.9	31.23	0.0112
30	35	30	11.4	28.39	0.0081
60	30	25	12.2	23.66	0.0059
250	20	15	13.8	14.19	0.0031
1440	14	9	14.8	8.52	0.0013



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 3	**DATE:**	06-Jan-24
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	16	A	J		
NUMBER OF BLOWS (LIQUID LIMIT)	32	27	28		
WET WEIGHT	39.2	31.7	31.6		
DRY WEIGHT	34.3	28.2	28		
MOISTURE	4.9	3.5	3.6		
TIN WEIGHT	14.2	14.2	14.3		
SOIL WEIGHT	20.1	14	13.7		
WATER CONTENT	24.4%	25.0%	26.3%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	N	L			
WET WEIGHT	24.5	27.1			
DRY WEIGHT	23	25.2			
MOISTURE	1.5	1.9			
TIN WEIGHT	14.2	14.1			
SOIL WEIGHT	8.8	11.1			
WATER CONTENT	17.0%	17.1%			

NATURAL WATER CONTENT ASTM D 4959

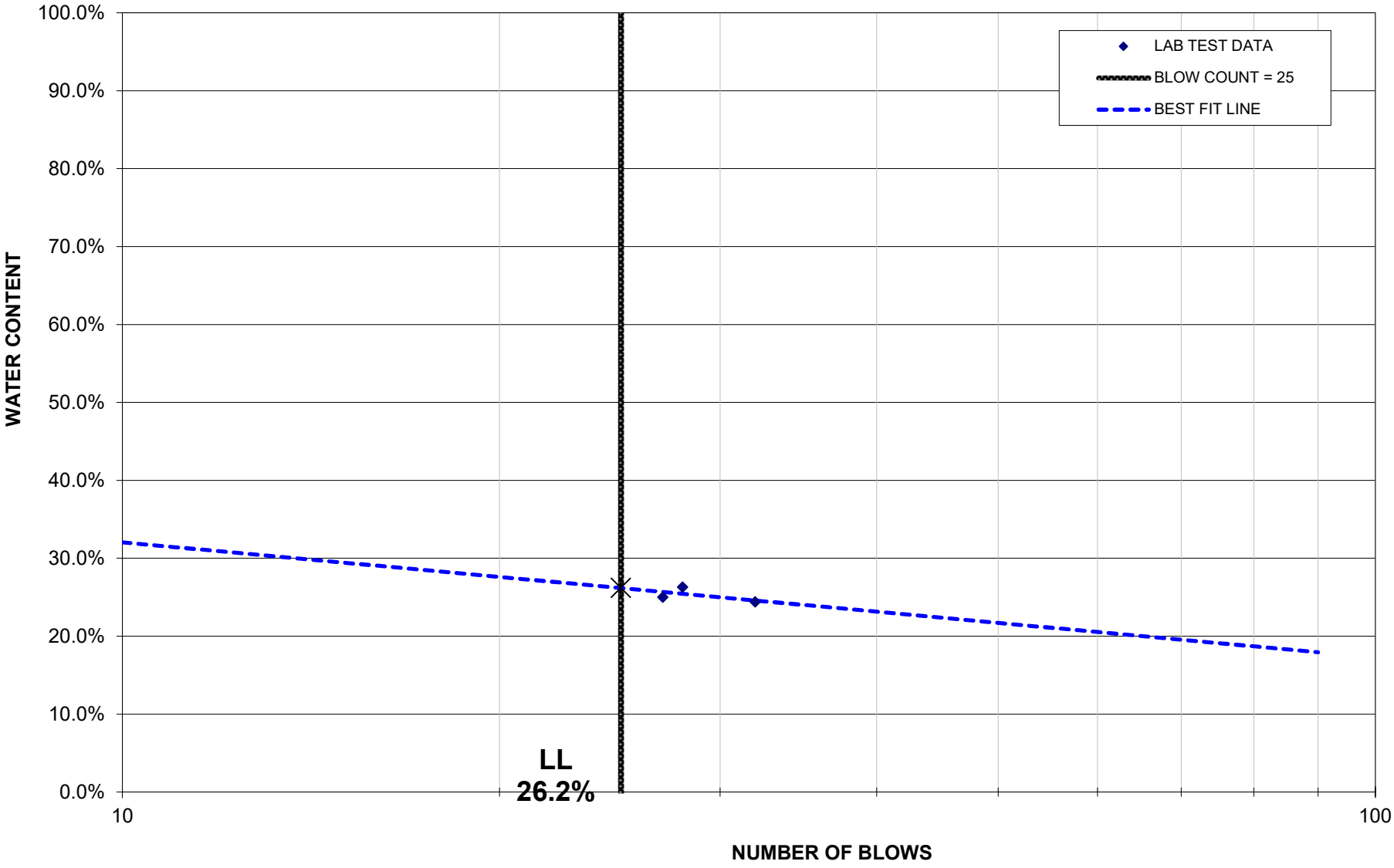
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	26.2%	PLASTIC LIMIT	17.1%
PLASTICITY INDEX	9.1%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	6-Jan-24
Hole Number	BH # 3
Depth:	6 ft
Technician:	Jemal

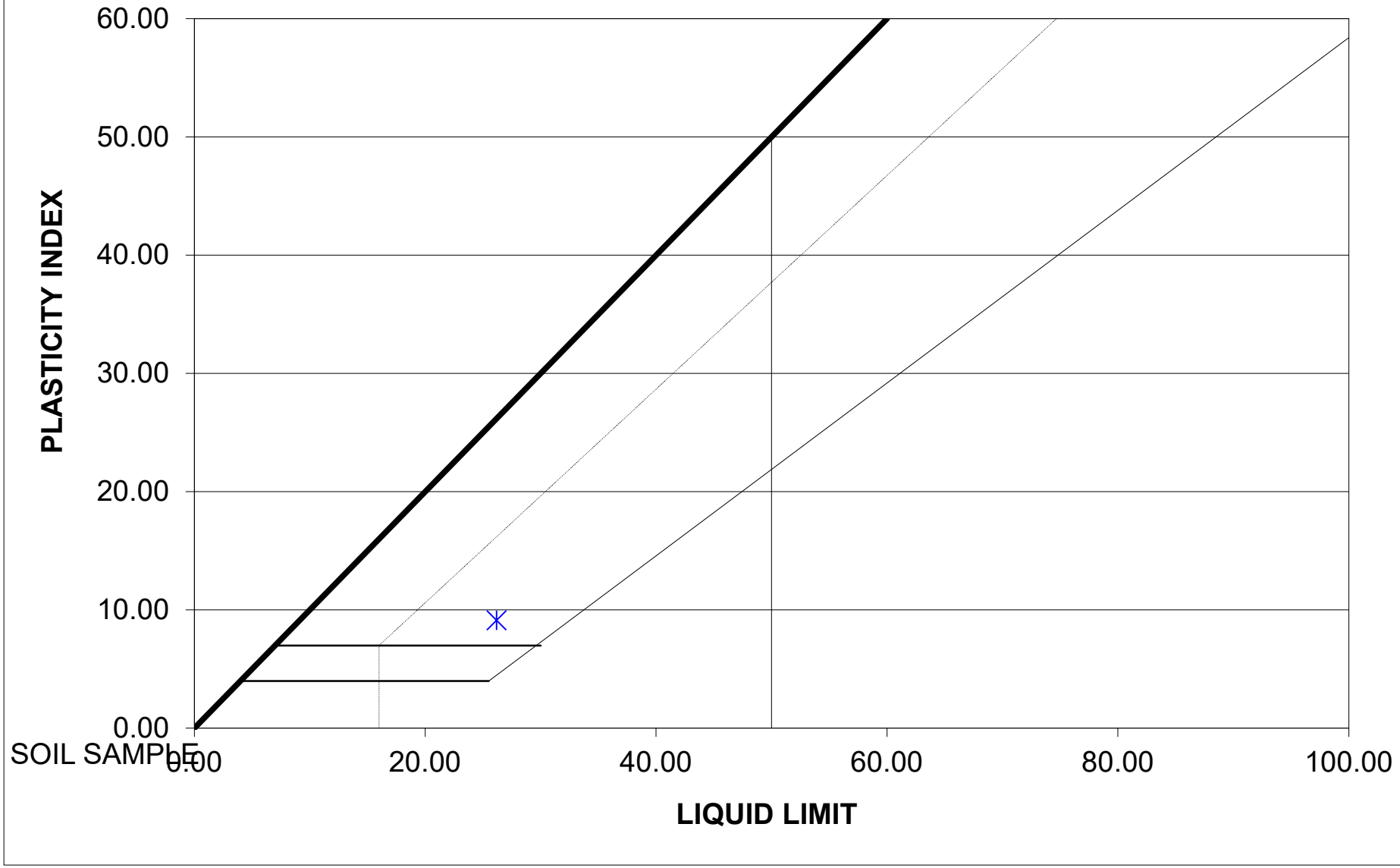
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	6-Jan-24
Hole Number	BH # 3
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 4	**DATE:**	06-Jan-24
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	2	E	C		
NUMBER OF BLOWS (LIQUID LIMIT)	34	29	24		
WET WEIGHT	33.7	31.7	31.5		
DRY WEIGHT	29.1	27.6	27.2		
MOISTURE	4.6	4.1	4.3		
TIN WEIGHT	14.2	14.2	14		
SOIL WEIGHT	14.9	13.4	13.2		
WATER CONTENT	30.9%	30.6%	32.6%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	17	A2			
WET WEIGHT	24.8	26.2			
DRY WEIGHT	23.3	24.4			
MOISTURE	1.5	1.8			
TIN WEIGHT	14.2	14.2			
SOIL WEIGHT	9.1	10.2			
WATER CONTENT	16.5%	17.6%			

NATURAL WATER CONTENT ASTM D 4959

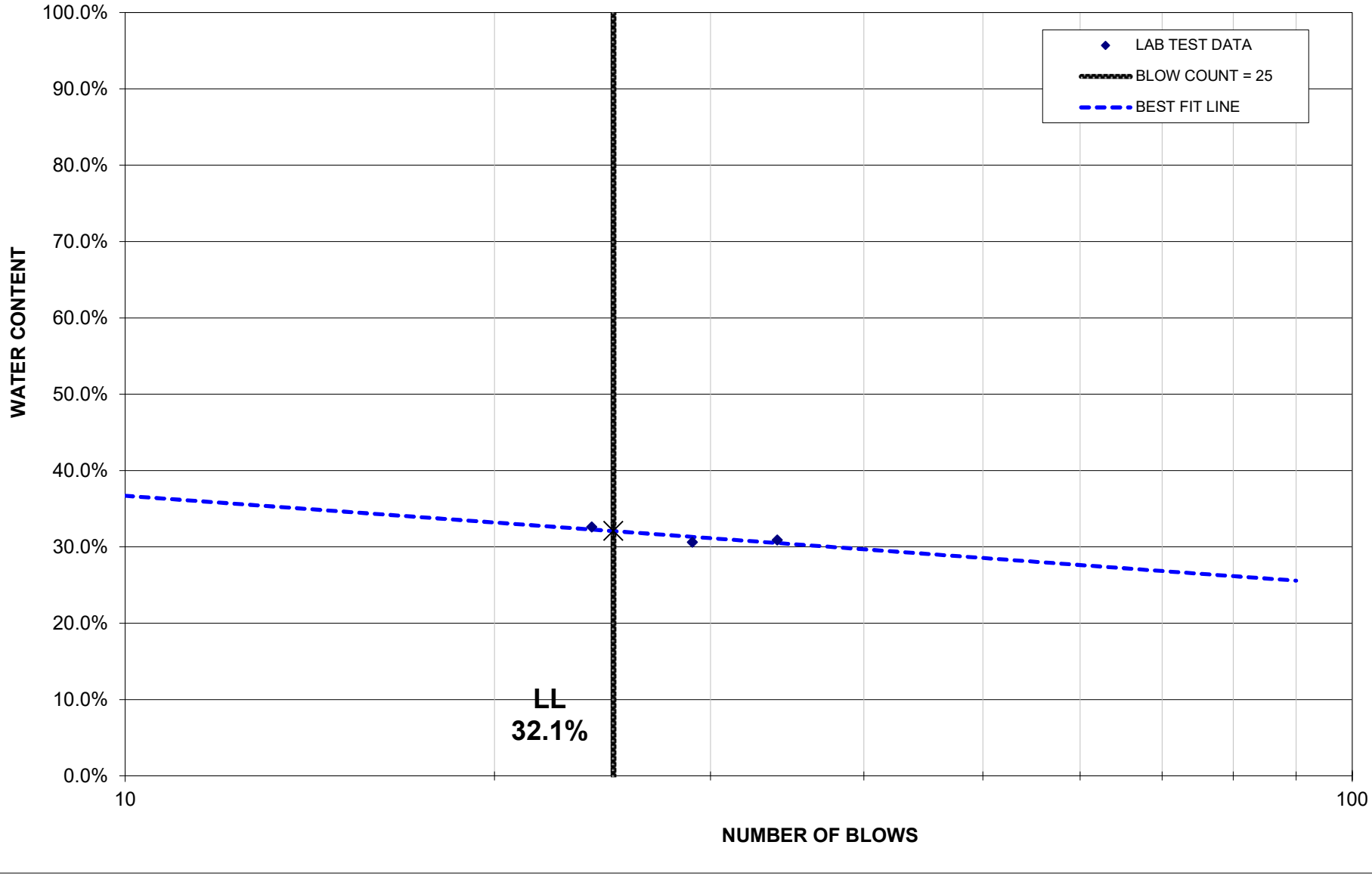
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	32.1%	PLASTIC LIMIT	17.1%
PLASTICITY INDEX	15.0%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	6-Jan-24
Hole Number	BH # 4
Depth:	6 ft
Technician:	Jemal

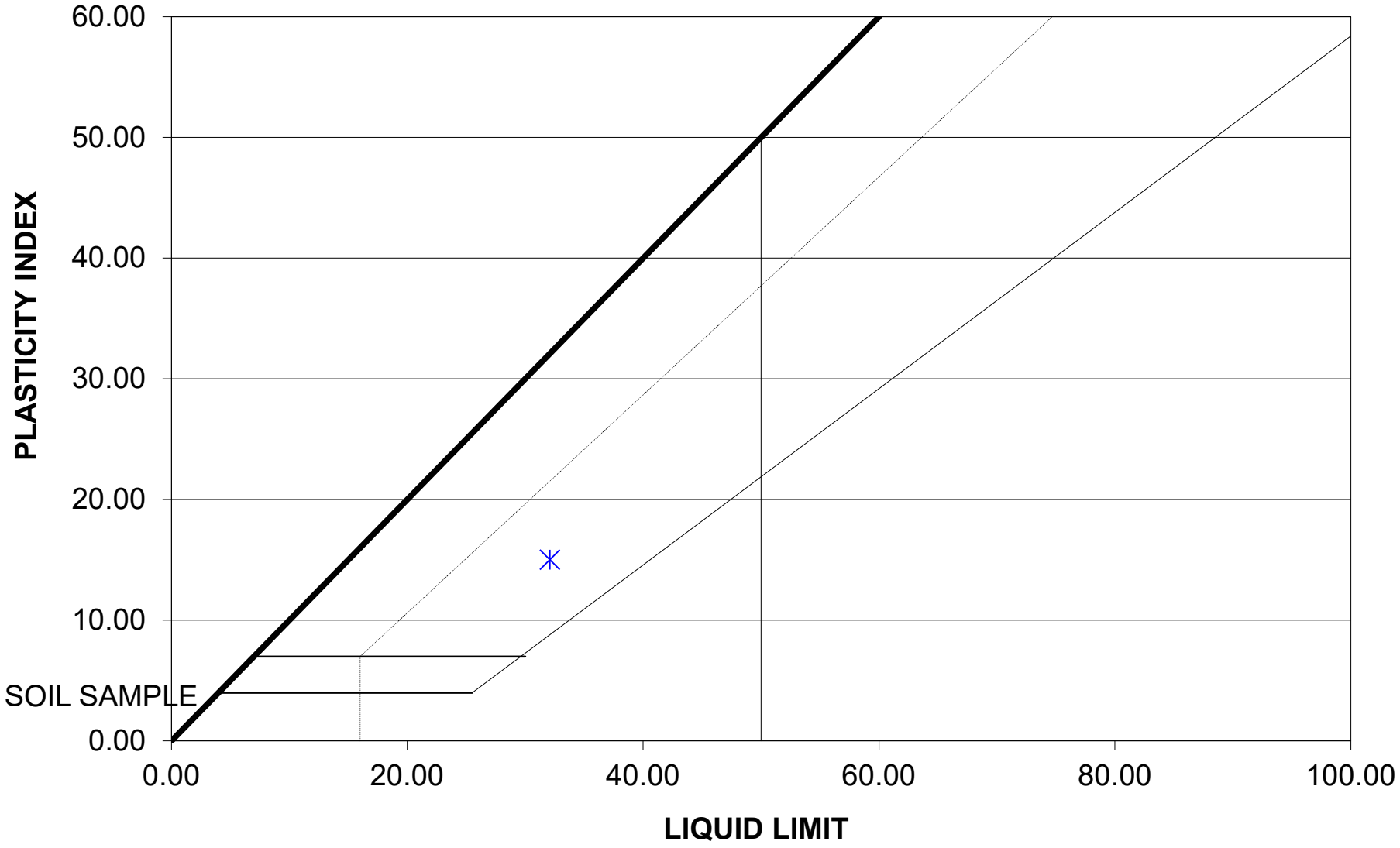
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	6-Jan-24
Hole Number	BH # 4
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 6	**DATE:**	18-Dec-23
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	T	15	A6		
NUMBER OF BLOWS (LIQUID LIMIT)	39	30	23		
WET WEIGHT	35.4	35.1	32.3		
DRY WEIGHT	29.9	29.5	27.3		
MOISTURE	5.5	5.6	5		
TIN WEIGHT	14.2	14.1	14.2		
SOIL WEIGHT	15.7	15.4	13.1		
WATER CONTENT	35.0%	36.4%	38.2%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	F	S			
WET WEIGHT	24.3	24.2			
DRY WEIGHT	23	22.9			
MOISTURE	1.3	1.3			
TIN WEIGHT	13.9	14.2			
SOIL WEIGHT	9.1	8.7			
WATER CONTENT	14.3%	14.9%			

NATURAL WATER CONTENT ASTM D 4959

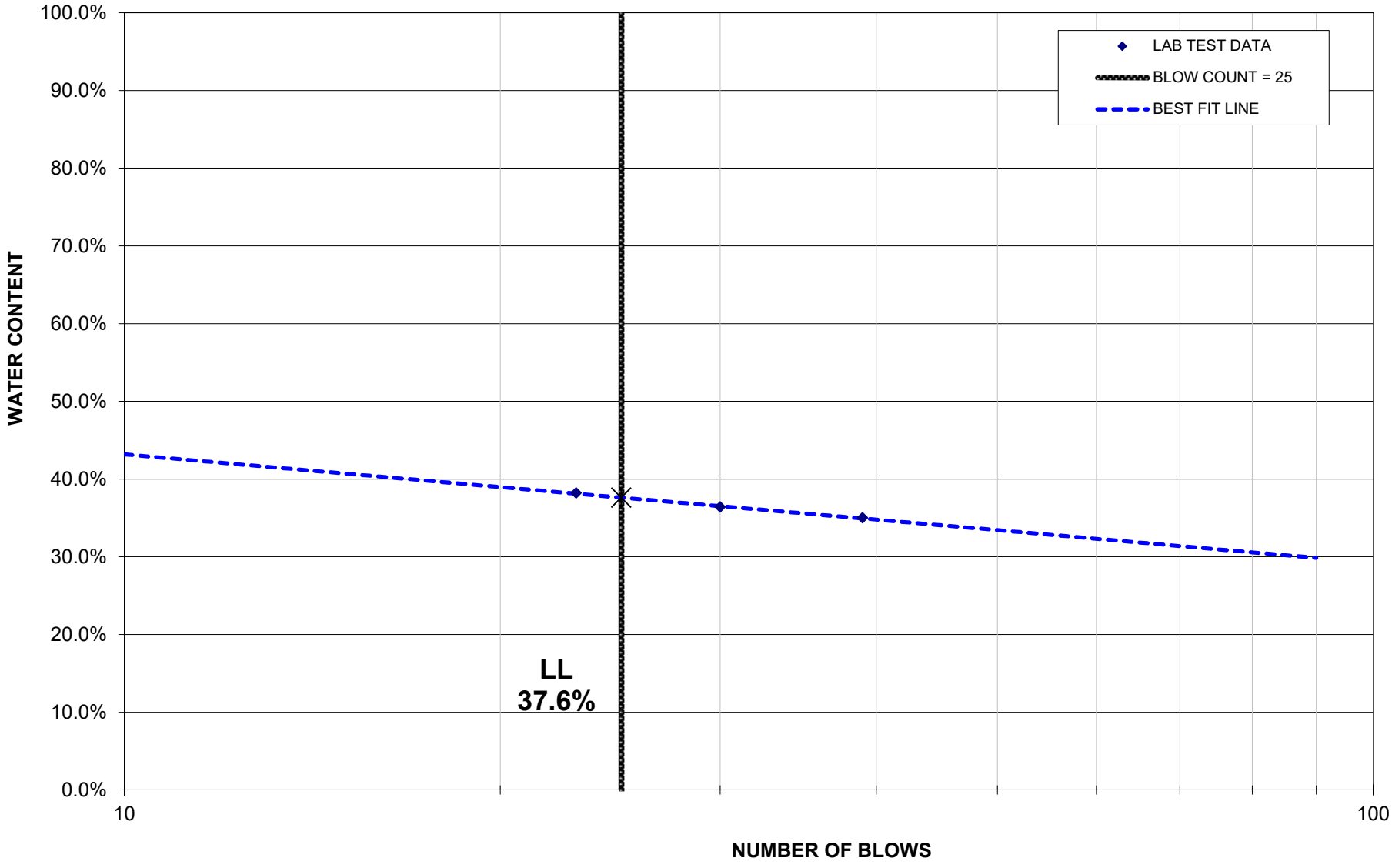
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	37.6%	PLASTIC LIMIT	14.6%
PLASTICITY INDEX	23.0%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 6
Depth:	6 ft
Technician:	Jemal

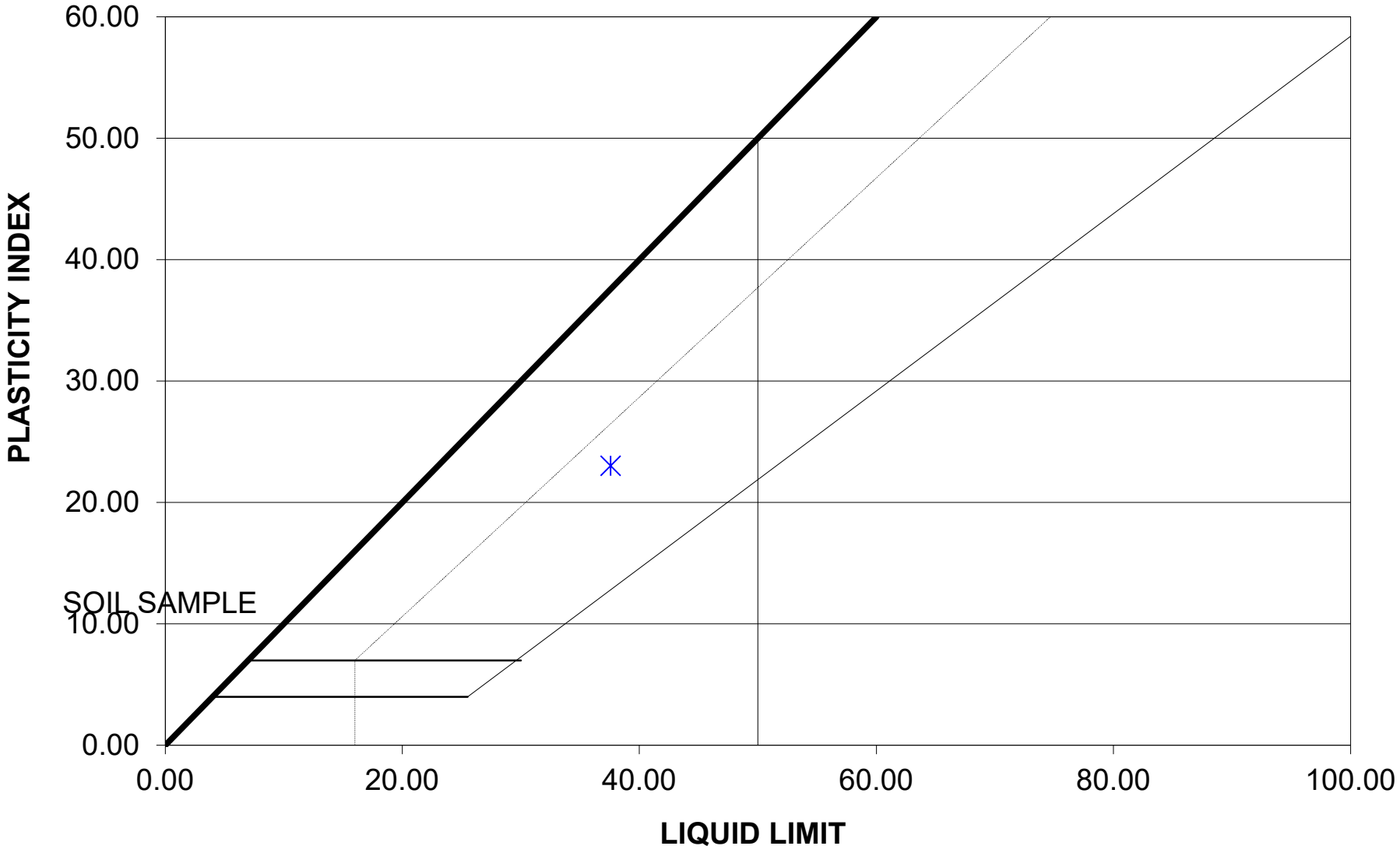
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 6
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 11	**DATE:**	18-Dec-23
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	A8	6	A7		
NUMBER OF BLOWS (LIQUID LIMIT)	42	30	26		
WET WEIGHT	33.8	33.3	33.6		
DRY WEIGHT	28.7	28.2	28.4		
MOISTURE	5.1	5.1	5.2		
TIN WEIGHT	14	14.1	14.3		
SOIL WEIGHT	14.7	14.1	14.1		
WATER CONTENT	34.7%	36.2%	36.9%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	16	11			
WET WEIGHT	24.9	25			
DRY WEIGHT	23.5	23.6			
MOISTURE	1.4	1.4			
TIN WEIGHT	14.2	14.1			
SOIL WEIGHT	9.3	9.5			
WATER CONTENT	15.1%	14.7%			

NATURAL WATER CONTENT ASTM D 4959

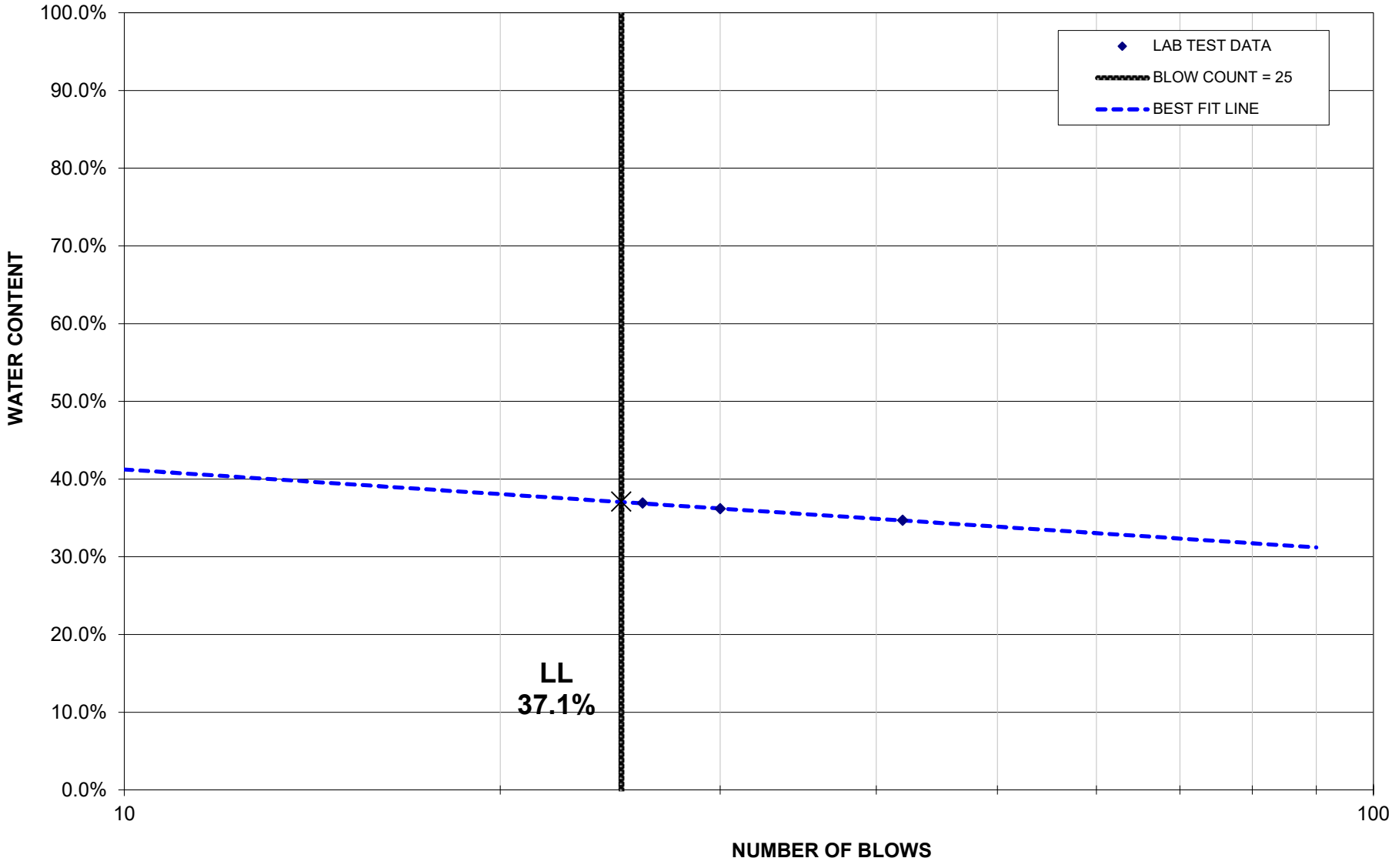
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	37.1%	PLASTIC LIMIT	14.9%
PLASTICITY INDEX	22.2%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 11
Depth:	6 ft
Technician:	Jemal

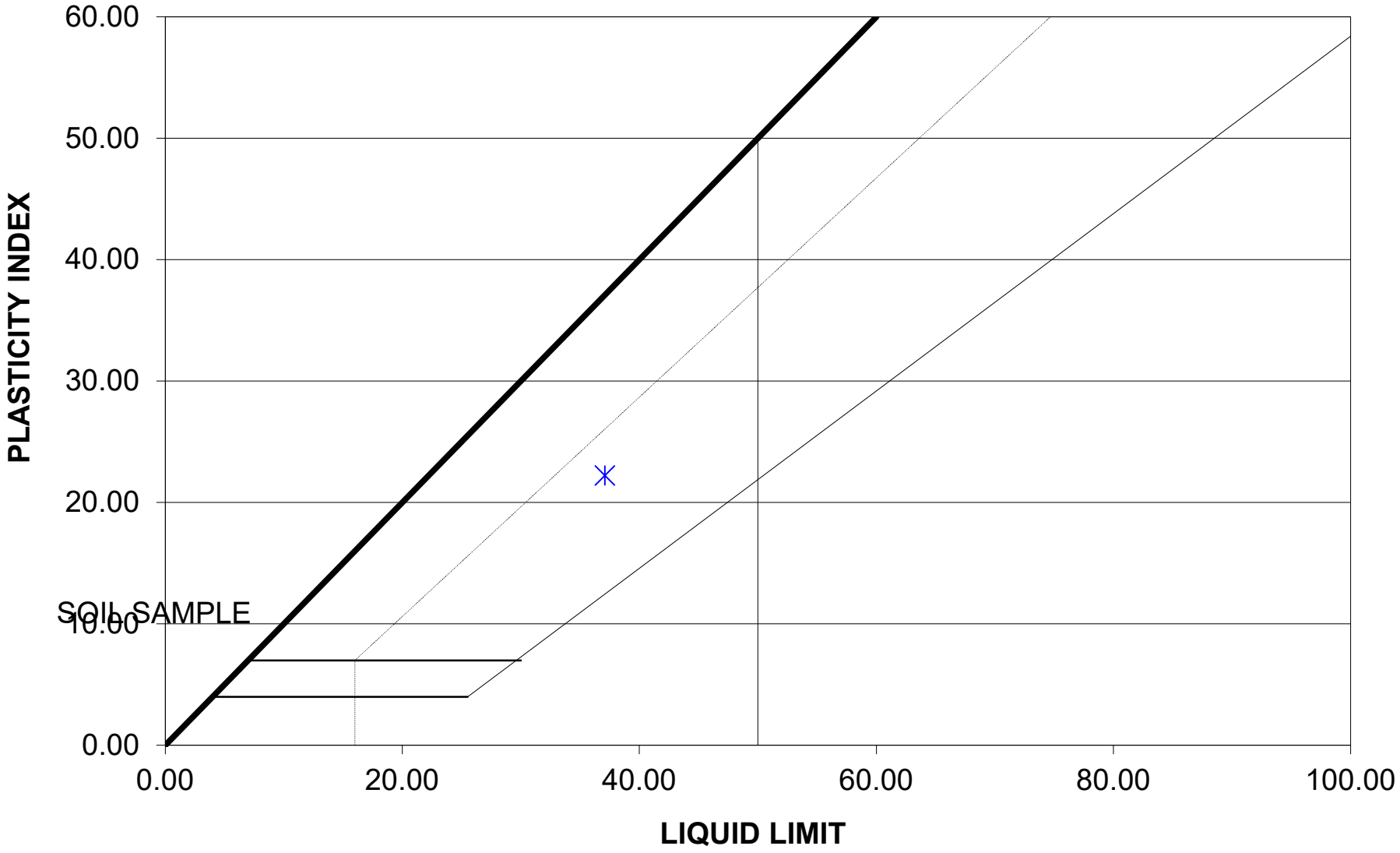
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 11
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 15	**DATE:**	18-Dec-23
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	D	B	C		
NUMBER OF BLOWS (LIQUID LIMIT)	41	30	24		
WET WEIGHT	34.1	36.2	35.4		
DRY WEIGHT	29.3	30.8	30		
MOISTURE	4.8	5.4	5.4		
TIN WEIGHT	14.2	14.3	14.3		
SOIL WEIGHT	15.1	16.5	15.7		
WATER CONTENT	31.8%	32.7%	34.4%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	A2	D2			
WET WEIGHT	23.4	24.2			
DRY WEIGHT	22.2	23			
MOISTURE	1.2	1.2			
TIN WEIGHT	14.1	14.2			
SOIL WEIGHT	8.1	8.8			
WATER CONTENT	14.8%	13.6%			

NATURAL WATER CONTENT ASTM D 4959

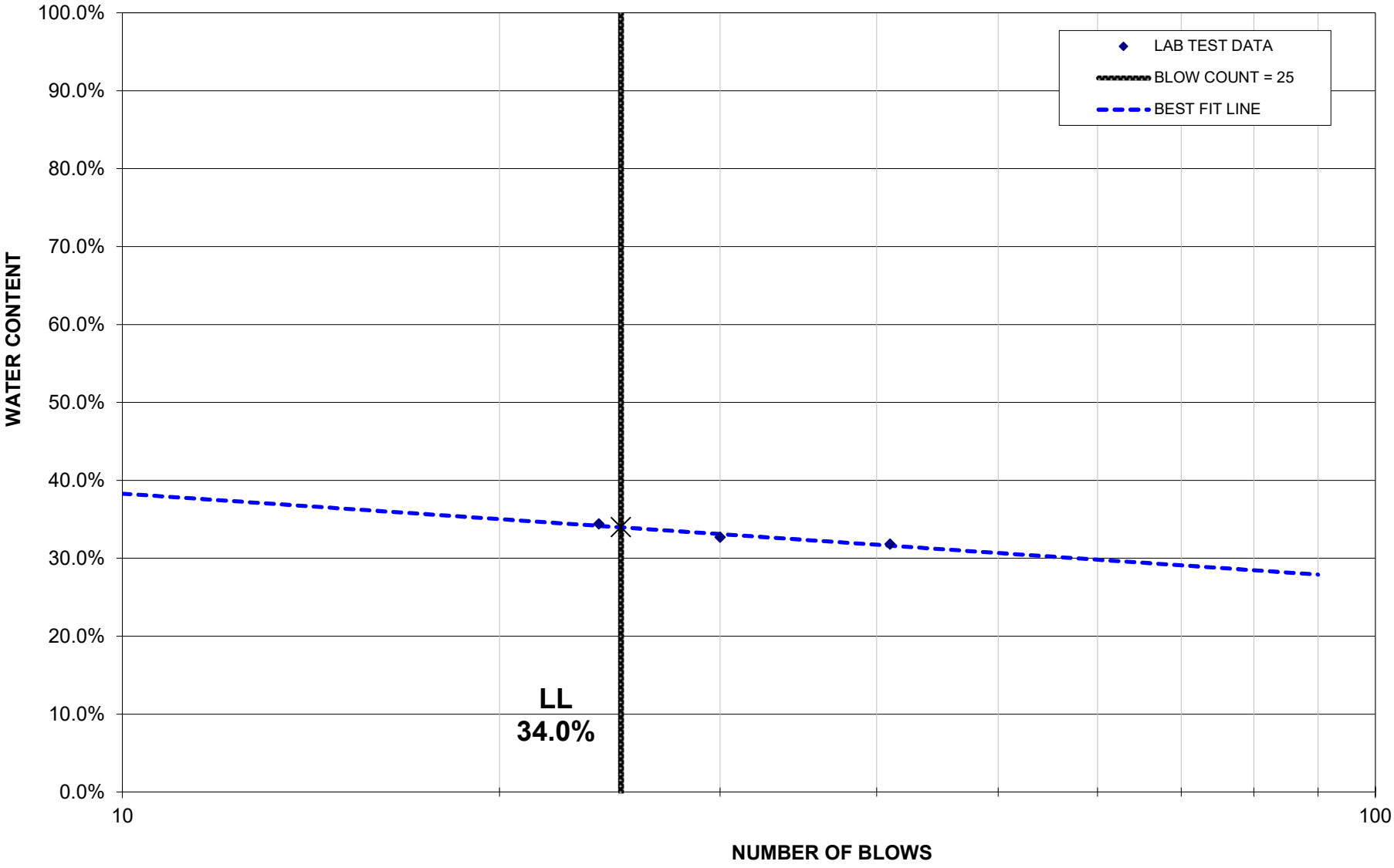
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	34.0%	PLASTIC LIMIT	14.2%
PLASTICITY INDEX	19.8%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 15
Depth:	6 ft
Technician:	Jemal

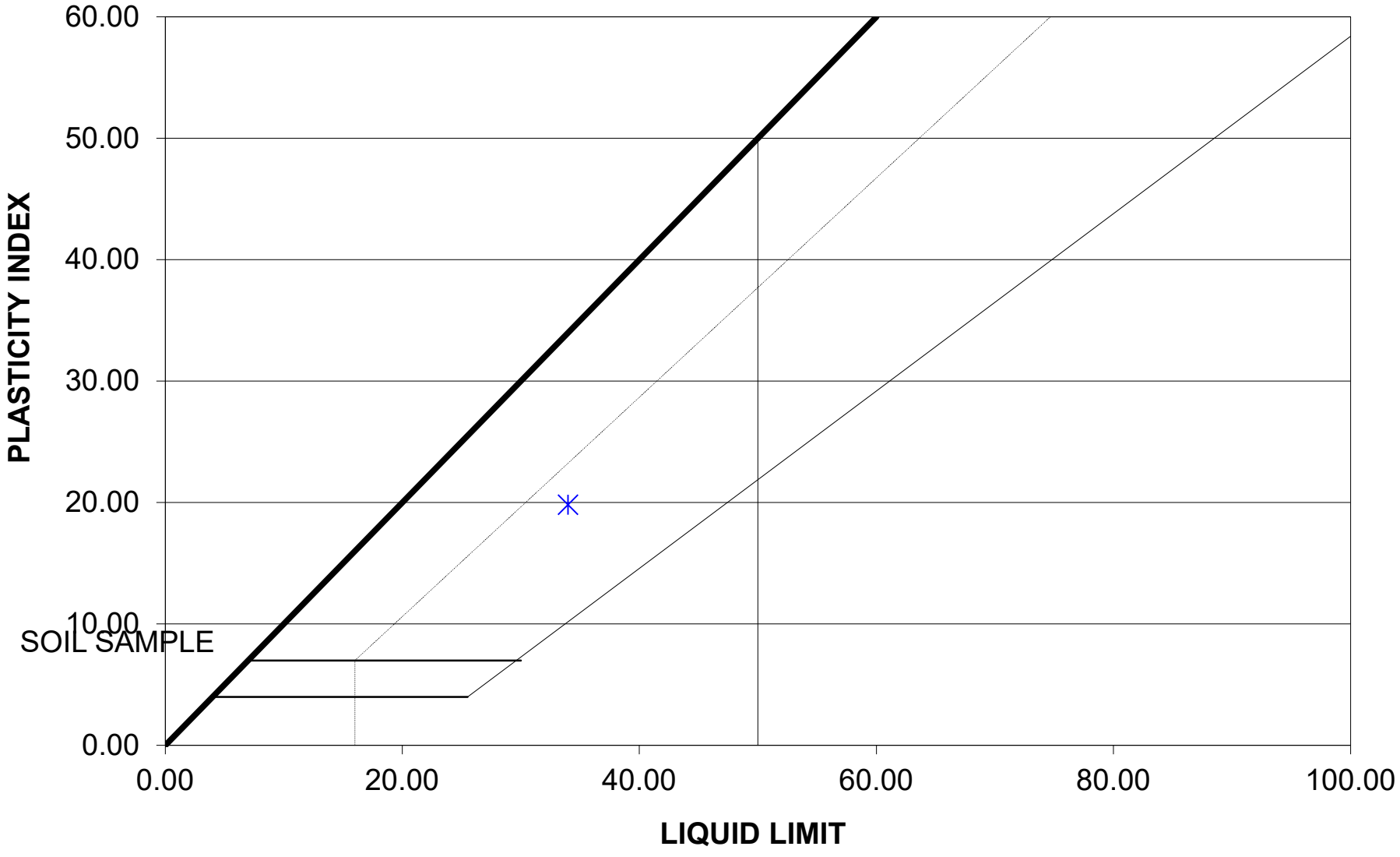
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 15
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 19	**DATE:**	18-Dec-23
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	C	A9	A4		
NUMBER OF BLOWS (LIQUID LIMIT)	32	22	17		
WET WEIGHT	35.1	34.1	33.4		
DRY WEIGHT	29.9	29	28.3		
MOISTURE	5.2	5.1	5.1		
TIN WEIGHT	14.2	14	14		
SOIL WEIGHT	15.7	15	14.3		
WATER CONTENT	33.1%	34.0%	35.7%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	16	11			
WET WEIGHT	24.9	25.4			
DRY WEIGHT	23.6	24			
MOISTURE	1.3	1.4			
TIN WEIGHT	14.1	14.5			
SOIL WEIGHT	9.5	9.5			
WATER CONTENT	13.7%	14.7%			

NATURAL WATER CONTENT ASTM D 4959

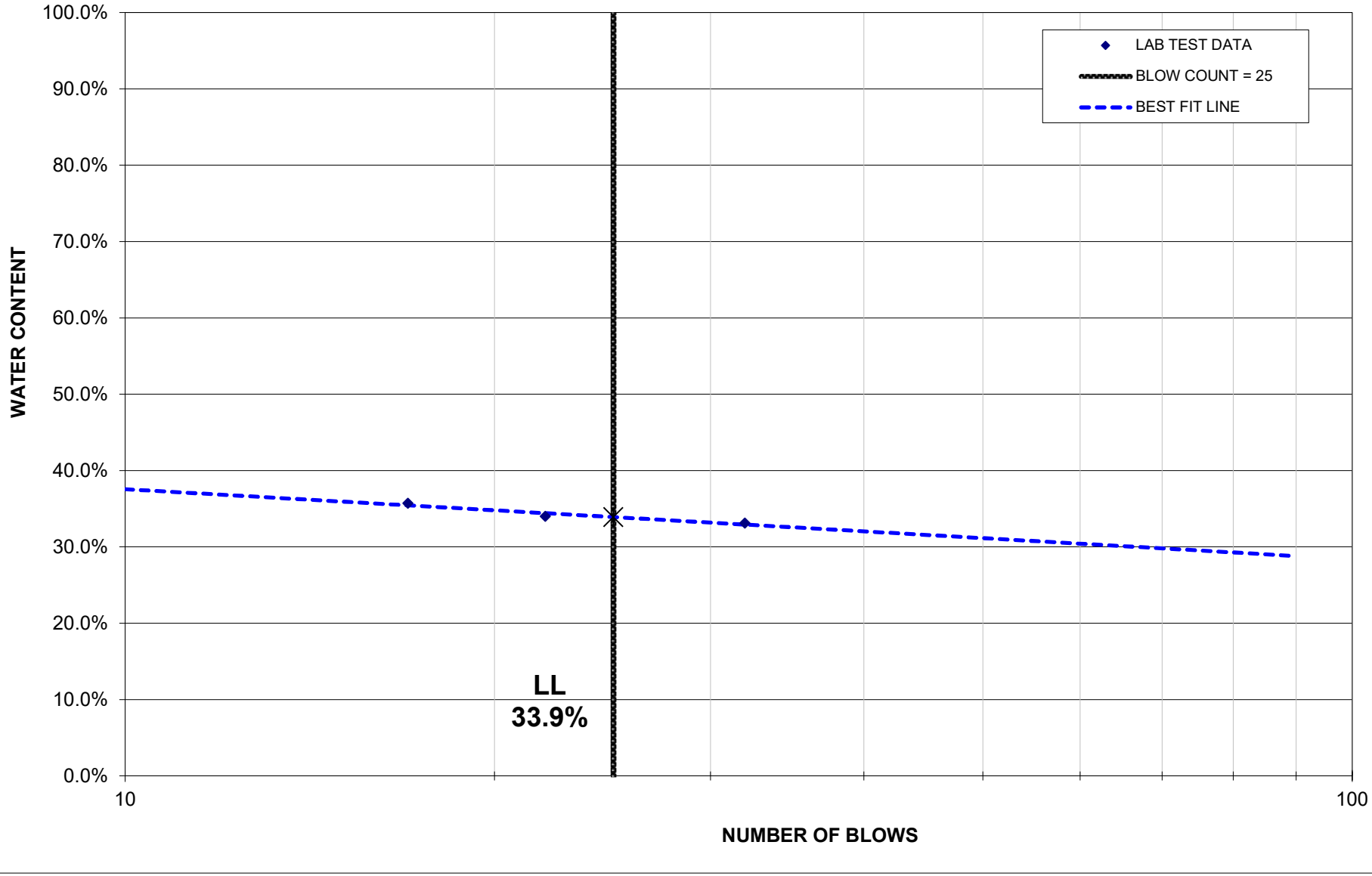
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	33.9%	PLASTIC LIMIT	14.2%
PLASTICITY INDEX	19.7%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 19
Depth:	6 ft
Technician:	Jemal

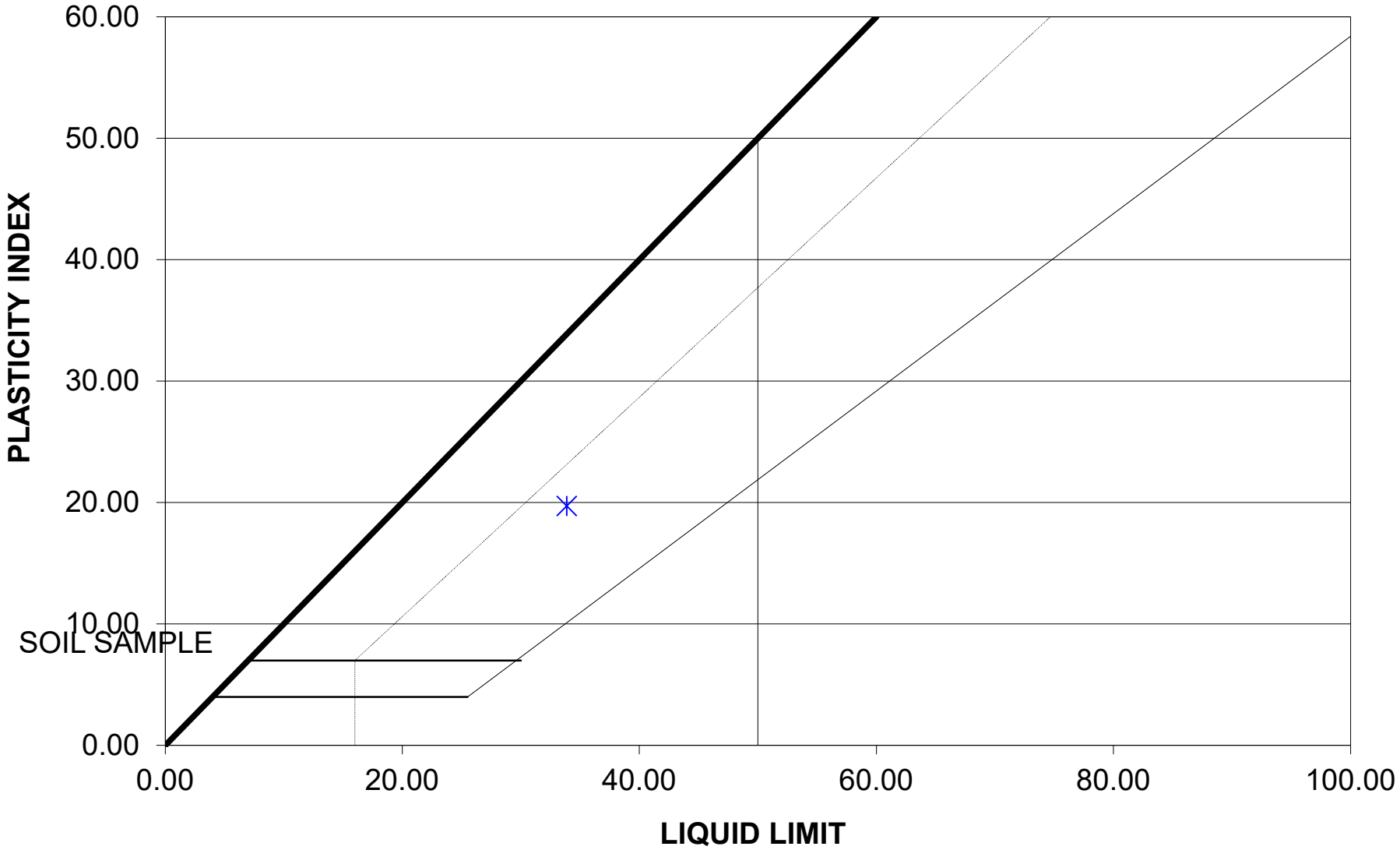
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 19
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



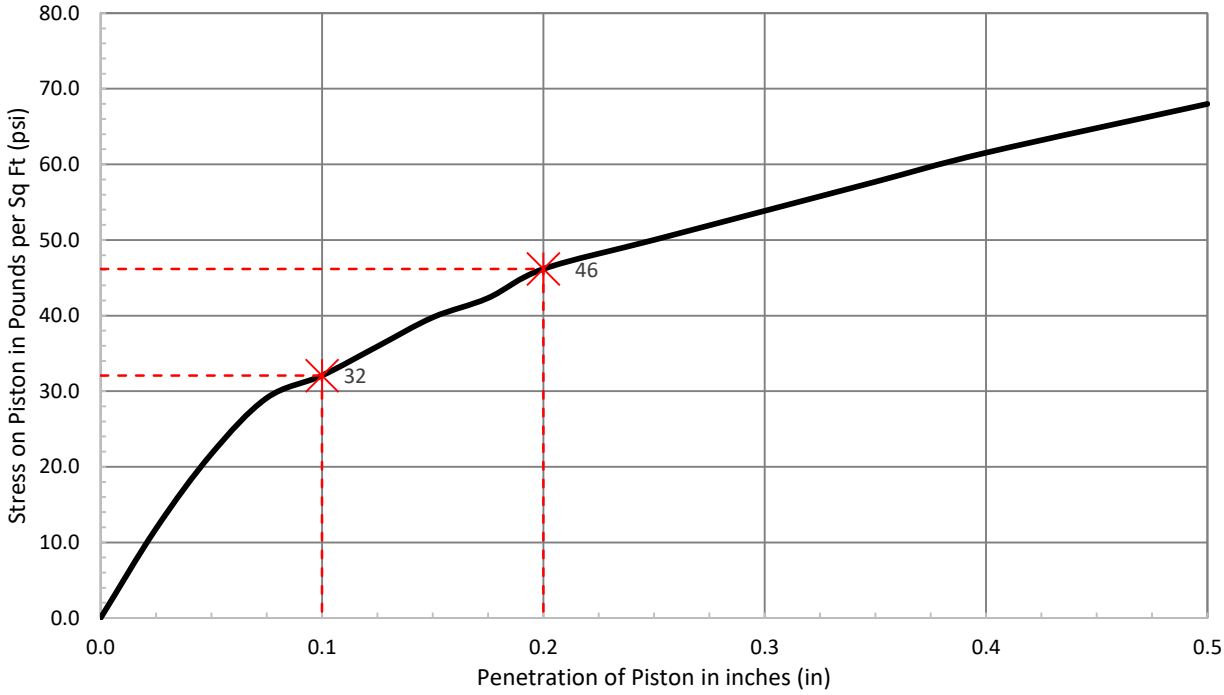
California Bearing Ratio

ASTM D1883-16, Soaking Method

WSP Canada Inc.
1003 53rd Ave NE
Calgary AB T2E 6X9

Type of Preparation	Standard ASTM D698	Sample Preparation	Soaked
Maximum Dry Density	1892 kg/m^3	Soaking time	96 hrs
Optimum Moisture Content	13.3 %	Top 1 Inch Soaked Moisture	17.3 %
Compacted Dry Density	1880 kg/m^3	Bottom 1 Inch Soaked Moisture	16.6 %
Compacted Moisture Content	15.5 %	Average Soaked Moisture	16.5 %
Percent Compaction	99.4 %	Mass of Surcharge	13.6 kg

Corrected Penetration (in.)	Standard Load of Crushed Stone (psi)	Corrected Load (psi)	CBR (%)
0.100	1000	32	**3.2**
0.200	1500	46	**3.1**



Client: Watt

Project: Netook Crossing

Site composite sample at 1.0 to 1.5 m depth

Project No: CA18784.8400_3903.T01

Site Location:

Date: February 26, 2024

Request No: -

Technologist: JCS

Reviewed By: HM

Soil Description: Silty Clay trace Organic

Liquid Limit -

Plastic Limit -

Plasticity Index -

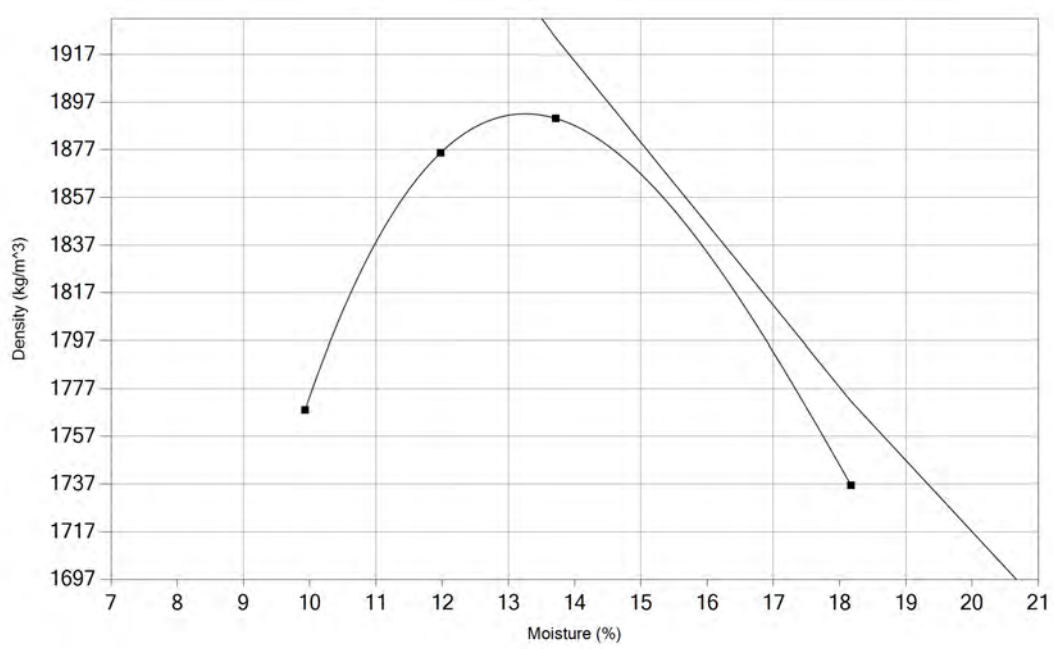
Swell 0.04%

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results will be provided only upon written request. If you are not the Intended recipient please notify us by telephone as soon as possible and either return the message by post or destroy it. If you are not the intended recipient, any use by you of its contents is prohibited.

Moisture / Density Relationship

Report Date: March 06, 2024 **Amend Date:** March 06, 2024

Client		Project	
Name:	Watt Consulting Group	**Name:**	(CA18784.8400) Netook Crossing (3903.T01)
Address:	3016 5 Ave NE Calgary, AB T2A 6K4	**Address:**	Calgary, AB
Attention:	Joel Rombough	**Phase:**	**Task:**
PO Number:		**Manager:**	Hamdan Marwasi
Sample Date:	2/22/2024 by Renato Lumawig	**Lab/Ref. #:**	NS666808
Source:	Composite Sample @ 1.0 to 1.5 m depth	**Description:**	Silty Clay trace organic



Moisture Density Relationship: (ASTM D698-12) Method: B

Preparation Method: Dry **Rammer Type:**Mechanical

Maximum Density (kg/m^3): 1892

Optimum Moisture (%): 13.3

Remarks:

Distribution:

Reviewed By: Hamdan Marwasi

Reporting of these test results constitutes a testing service only.

WSP E&I Canada Ltd. - 1003 53rd Avenue NE - Calgary, AB - T2E 6X9

AR Geotechnical Engineering

Sulphate Test

http://www.argeoeng.com

CLIENT NAME: Watt Consulting **ATTENTION TO: Ayoub Ramadan**

SAMPLING SITE: Olds Subdivision **SAMPLED BY: Getu**

Soil Analysis - Sulfate

DATE RECEIVED: 2024-01-21 **DATE REPORTED: 2024-01-29**

Parameter	Unit	SAMPLE DESCRIPTION:	BH23-25 (GB-1m)	BH23-16 (GB-2m)	BH23-08 (GB-2m)	BH23-08 (GB-2m)
		SAMPLE TYPE:	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2024-01-21	2024-01-21	2024-01-21	2024-01-21
			5608878	5608880	5608882	5608884
Saturation Percentage	%		32	38	36	33
Sulfate (SO4-S), Soluble	mg/L		918	521	625	890
Sulfur (as Sulfate), Soluble (meq/L)	meq/L		19.1	10.8	14.5	18.8

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 1						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	A7	A8	A9	B1	B2	B3
Wt. Sample Wet + Tare (g)	259.9	287.1	285.3	262.9	286.3	268.8
Wt. Sample Dry + Tare (g)	224.1	247.9	247.2	228.1	248.0	231.9
Wt. Water (g)	35.8	39.2	38.1	34.8	38.3	36.9
Tare Container (g)	4.1	4.1	4.2	4.4	4.3	4.3
Wt. Dry Sample (g)	220.0	243.8	243.0	223.7	243.7	227.6
Moist Content	16.3%	16.1%	15.7%	15.6%	15.7%	16.2%

BH # 2						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	36.0	29.0	103.0	12.0	19.0	37.0
Wt. Sample Wet + Tare (g)	250.6	297.8	240.8	249.2	222.8	242.6
Wt. Sample Dry + Tare (g)	218.7	258.3	208.9	218.8	197.3	210.7
Wt. Water (g)	31.9	39.5	31.9	30.4	25.5	31.9
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	214.3	253.9	204.5	214.4	192.9	206.3
Moist Content	14.9%	15.6%	15.6%	14.2%	13.2%	15%

BH # 3						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	33.0	41.0	13.0	44.0	20.0	22.0
Wt. Sample Wet + Tare (g)	298.2	286.8	261.5	283.3	271.0	276.9
Wt. Sample Dry + Tare (g)	259.7	251.6	227.5	243.6	233.8	238.9
Wt. Water (g)	38.5	35.2	34.0	39.7	37.2	38.0
Tare Container (g)	4.0	4.0	4.3	4.5	4.4	4.3
Wt. Dry Sample (g)	255.7	247.6	223.2	239.1	229.4	234.6
Moist Content	15.1%	14.2%	15.2%	16.6%	16.2%	16.2%

BH # 4						
Depth	1	2				
Tare No.	23.0	38.0				
Wt. Sample Wet + Tare (g)	241.7	230.3				
Wt. Sample Dry + Tare (g)	209.0	198.0				
Wt. Water (g)	32.7	32.3				
Tare Container (g)	4.3	4.3				
Wt. Dry Sample (g)	204.7	193.7				
Moist Content	16.0%	16.7%				

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 5						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	28A	4A	55.0	9.0	19A	2A
Wt. Sample Wet + Tare (g)	259.8	282.4	247.0	257.4	242.5	275.0
Wt. Sample Dry + Tare (g)	227.7	245.6	215.1	223.9	210.6	239.8
Wt. Water (g)	32.1	36.8	31.9	33.5	31.9	35.2
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	223.3	241.2	210.7	219.5	206.2	235.4
Moist Content	14.4%	15.3%	15.1%	15.3%	15.5%	15%

BH # 6						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	61.0	40.0	45.0	15.0	11.0	27.0
Wt. Sample Wet + Tare (g)	252.7	237.2	252.4	221.4	246.1	258.5
Wt. Sample Dry + Tare (g)	222.5	204.9	218.6	193.3	212.2	223.9
Wt. Water (g)	30.2	32.3	33.8	28.1	33.9	34.6
Tare Container (g)	4.3	4.4	4.3	4.5	4.4	4.3
Wt. Dry Sample (g)	218.2	200.5	214.3	188.8	207.8	219.6
Moist Content	13.8%	16.1%	15.8%	14.9%	16.3%	15.8%

BH # 7						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	35.0	16.0	18.0	14.0	46.0	30.0
Wt. Sample Wet + Tare (g)	225.9	237.5	282.2	266.3	273.9	276.4
Wt. Sample Dry + Tare (g)	195.0	205.5	243.6	230.3	236.6	239.2
Wt. Water (g)	30.9	32.0	38.6	36.0	37.3	37.2
Tare Container (g)	4.3	4.4	4.3	4.3	4.3	4.3
Wt. Dry Sample (g)	190.7	201.1	239.3	226.0	232.3	234.9
Moist Content	16.2%	15.9%	16.1%	15.9%	16.1%	15.8%

BH # 8						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	11.0	27.0	61.0	40.0	15.0	45.0
Wt. Sample Wet + Tare (g)	245.9	275.0	288.8	251.3	268.5	272.0
Wt. Sample Dry + Tare (g)	212.5	234.5	248.5	216.6	232.4	236.0
Wt. Water (g)	33.4	40.5	40.3	34.7	36.1	36.0
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	208.1	230.1	244.1	212.2	228.0	231.6
Moist Content	16.0%	17.6%	16.5%	16.4%	15.8%	16%

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 9						
Depth	1	4	5	6 SPT		
Tare No.	60.0	32.0	28.0	34.0		
Wt. Sample Wet + Tare (g)	246.9	266.7	264.6	257.5		
Wt. Sample Dry + Tare (g)	222.8	232.6	230.4	223.5		
Wt. Water (g)	24.1	34.1	34.2	34.0		
Tare Container (g)	4.5	4.5	4.3	4.3		
Wt. Dry Sample (g)	218.3	228.1	226.1	219.2		
Moist Content	11.0%	14.9%	15.1%	15.5%		

BH # 10						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	A6	A4	A1	A3	A2	A5
Wt. Sample Wet + Tare (g)	257.9	300.2	269.4	274.5	289.7	284.8
Wt. Sample Dry + Tare (g)	234.2	263.4	240.3	241.8	256.9	250.5
Wt. Water (g)	23.7	36.8	29.1	32.7	32.8	34.3
Tare Container (g)	4.4	4.3	4.2	4.4	4.3	4.3
Wt. Dry Sample (g)	229.8	259.1	236.1	237.4	252.6	246.2
Moist Content	10.3%	14.2%	12.3%	13.8%	13.0%	13.9%

BH # 11						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	104.0	2.0	17.0	64.0	3.0	29A
Wt. Sample Wet + Tare (g)	219.4	233.1	225.7	236.8	227.0	220.8
Wt. Sample Dry + Tare (g)	190.3	202.6	195.2	205.3	196.8	190.7
Wt. Water (g)	29.1	30.5	30.5	31.5	30.2	30.1
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	185.9	198.2	190.8	200.9	192.4	186.3
Moist Content	15.7%	15.4%	16.0%	15.7%	15.7%	16%

BH # 12						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	B4	B5	B6	B7	B8	B9
Wt. Sample Wet + Tare (g)	269.5	282.0	271.6	290.7	276.5	284.8
Wt. Sample Dry + Tare (g)	237.2	248.3	236.1	252.4	242.9	251.0
Wt. Water (g)	32.3	33.7	35.5	38.3	33.6	33.8
Tare Container (g)	4.1	4.0	4.1	4.1	4.1	4.1
Wt. Dry Sample (g)	233.1	244.3	232.0	248.3	238.8	246.9
Moist Content	13.9%	13.8%	15.3%	15.4%	14.1%	13.7%

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 13						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	28.0	23.0	32.0	38.0	60.0	34.0
Wt. Sample Wet + Tare (g)	281.6	276.2	263.9	269.4	271.2	267.4
Wt. Sample Dry + Tare (g)	244.9	238.2	228.9	234.9	238.1	230.7
Wt. Water (g)	36.7	38.0	35.0	34.5	33.1	36.7
Tare Container (g)	4.4	4.3	4.3	4.3	4.3	4.3
Wt. Dry Sample (g)	240.5	233.9	224.6	230.6	233.8	226.4
Moist Content	15.3%	16.2%	15.6%	15.0%	14.2%	16.2%

BH # 14						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	36.0	103.0	37.0	19.0	12.0	29.0
Wt. Sample Wet + Tare (g)	289.8	264.9	248.0	287.9	286.4	276.6
Wt. Sample Dry + Tare (g)	258.1	236.1	223.1	257.8	256.7	243.5
Wt. Water (g)	31.7	28.8	24.9	30.1	29.7	33.1
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	253.7	231.7	218.7	253.4	252.3	239.1
Moist Content	12.5%	12.4%	11.4%	11.9%	11.8%	14%

BH # 15						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	44.0	13.0	33.0	22.0	20.0	41.0
Wt. Sample Wet + Tare (g)	237.9	242.7	249.1	232.1	231.1	239.0
Wt. Sample Dry + Tare (g)	209.2	215.0	218.2	204.6	200.9	208.6
Wt. Water (g)	28.7	27.7	30.9	27.5	30.2	30.4
Tare Container (g)	4.3	4.4	4.6	4.3	4.3	4.3
Wt. Dry Sample (g)	204.9	210.6	213.6	200.3	196.6	204.3
Moist Content	14.0%	13.2%	14.5%	13.7%	15.4%	14.9%

BH # 16						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	A7	A8	A9	B1	B2	B3
Wt. Sample Wet + Tare (g)	255.0	284.1	274.1	285.2	276.0	277.9
Wt. Sample Dry + Tare (g)	232.5	252.6	241.0	251.6	243.4	245.3
Wt. Water (g)	22.5	31.5	33.1	33.6	32.6	32.6
Tare Container (g)	4.4	4.3	4.3	4.3	4.3	4.3
Wt. Dry Sample (g)	228.1	248.3	236.7	247.3	239.1	241.0
Moist Content	9.9%	12.7%	14.0%	13.6%	13.6%	13.5%

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 17						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	46.0	30.0	18.0	35.0	16.0	14.0
Wt. Sample Wet + Tare (g)	277.5	293.8	275.0	275.2	281.2	282.9
Wt. Sample Dry + Tare (g)	245.5	254.9	239.0	239.9	246.5	245.5
Wt. Water (g)	32.0	38.9	36.0	35.3	34.7	37.4
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	241.1	250.5	234.6	235.5	242.1	241.1
Moist Content	13.3%	15.5%	15.3%	15.0%	14.3%	16%

BH # 18						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	25.0	39.0	42.0	47.0	31.0	55.0
Wt. Sample Wet + Tare (g)	221.4	235.0	236.3	211.6	241.9	234.7
Wt. Sample Dry + Tare (g)	198.0	207.2	206.3	185.8	211.5	206.5
Wt. Water (g)	23.4	27.8	30.0	25.8	30.4	28.2
Tare Container (g)	4.4	4.4	4.3	4.3	4.3	4.6
Wt. Dry Sample (g)	193.6	202.8	202.0	181.5	207.2	201.9
Moist Content	12.1%	13.7%	14.9%	14.2%	14.7%	14.0%

BH # 19						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	A1	A2	A3	A4	A5	A6
Wt. Sample Wet + Tare (g)	252.3	253.1	279.7	276.7	280.7	277.9
Wt. Sample Dry + Tare (g)	219.4	230.3	252.4	249.9	252.9	244.7
Wt. Water (g)	32.9	22.8	27.3	26.8	27.8	33.2
Tare Container (g)	4.4	4.3	4.3	4.3	4.3	4.3
Wt. Dry Sample (g)	215.0	226.0	248.1	245.6	248.6	240.4
Moist Content	15.3%	10.1%	11.0%	10.9%	11.2%	13.8%

BH # 20						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	2A	28A	19A	4A	55.0	9.0
Wt. Sample Wet + Tare (g)	201.0	262.0	253.9	241.1	274.2	259.8
Wt. Sample Dry + Tare (g)	185.1	233.0	226.6	220.9	251.5	244.5
Wt. Water (g)	15.9	29.0	27.3	20.2	22.7	15.3
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	180.7	228.6	222.2	216.5	247.1	240.1
Moist Content	8.8%	12.7%	12.3%	9.3%	9.2%	6%

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 21						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	37.0	7.0	5.0	21.0	111.0	1.0
Wt. Sample Wet + Tare (g)	279.4	265.2	264.4	291.3	271.0	275.9
Wt. Sample Dry + Tare (g)	251.5	239.0	225.9	259.7	240.9	233.3
Wt. Water (g)	27.9	26.2	38.5	31.6	30.1	42.6
Tare Container (g)	4.4	4.4	4.3	4.3	4.3	4.6
Wt. Dry Sample (g)	247.1	234.6	221.6	255.4	236.6	228.7
Moist Content	11.3%	11.2%	17.4%	12.4%	12.7%	18.6%

BH # 22						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	C1	C2	C3	C4	C5	C6
Wt. Sample Wet + Tare (g)	268.8	285.2	286.7	272.2	279.0	268.4
Wt. Sample Dry + Tare (g)	234.7	246.7	246.2	236.3	244.3	231.9
Wt. Water (g)	34.1	38.5	40.5	35.9	34.7	36.5
Tare Container (g)	4.1	4.0	4.1	4.1	4.1	4.1
Wt. Dry Sample (g)	230.6	242.7	242.1	232.2	240.2	227.8
Moist Content	14.8%	15.9%	16.7%	15.5%	14.4%	16.0%

BH # 23						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	47.0	55.0	25.0	31.0	39.0	42.0
Wt. Sample Wet + Tare (g)	219.4	227.3	276.4	250.5	243.1	273.2
Wt. Sample Dry + Tare (g)	196.4	197.4	239.8	217.1	210.3	234.3
Wt. Water (g)	23.0	29.9	36.6	33.4	32.8	38.9
Tare Container (g)	4.4	4.5	4.4	4.3	4.4	4.4
Wt. Dry Sample (g)	192.0	192.9	235.4	212.8	205.9	229.9
Moist Content	12.0%	15.5%	15.5%	15.7%	15.9%	17%

BH # 24						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	37.0	21.0	111.0	7.0	5.0	1.0
Wt. Sample Wet + Tare (g)	241.9	205.5	243.7	232.0	234.5	233.8
Wt. Sample Dry + Tare (g)	212.6	180.4	212.0	202.8	205.1	203.2
Wt. Water (g)	29.3	25.1	31.7	29.2	29.4	30.6
Tare Container (g)	4.4	4.4	4.3	4.3	4.3	4.6
Wt. Dry Sample (g)	208.2	176.0	207.7	198.5	200.8	198.6
Moist Content	14.1%	14.3%	15.3%	14.7%	14.6%	15.4%

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

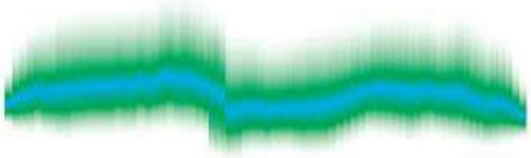
BH # 25						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	43.0	52.0	24.0	100.0	8.0	47A
Wt. Sample Wet + Tare (g)	243.0	275.1	281.5	258.0	238.2	296.8
Wt. Sample Dry + Tare (g)	215.6	246.5	245.3	225.8	208.0	259.4
Wt. Water (g)	27.4	28.6	36.2	32.2	30.2	37.4
Tare Container (g)	4.3	4.5	4.3	4.1	4.3	4.4
Wt. Dry Sample (g)	211.3	242.0	241.0	221.7	203.7	255.0
Moist Content	13.0%	11.8%	15.0%	14.5%	14.8%	14.7%

BH # 26						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	8.0	24.0	43.0	52.0	48.0	47A
Wt. Sample Wet + Tare (g)	281.5	288.8	264.3	280.3	256.6	263.8
Wt. Sample Dry + Tare (g)	244.8	249.4	227.7	241.4	221.0	227.7
Wt. Water (g)	36.7	39.4	36.6	38.9	35.6	36.1
Tare Container (g)	4.3	4.3	4.3	4.5	4.5	4.4
Wt. Dry Sample (g)	240.5	245.1	223.4	236.9	216.5	223.3
Moist Content	15.3%	16.1%	16.4%	16.4%	16.4%	16%

BH # 27						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	3.0	64.0	2.0	104.0	29A	17.0
Wt. Sample Wet + Tare (g)	269.7	282.6	264.4	275.8	288.8	266.6
Wt. Sample Dry + Tare (g)	238.5	249.4	228.2	238.7	249.8	231.5
Wt. Water (g)	31.2	33.2	36.2	37.1	39.0	35.1
Tare Container (g)	4.4	4.5	4.3	4.4	4.3	4.3
Wt. Dry Sample (g)	234.1	244.9	223.9	234.3	245.5	227.2
Moist Content	13.3%	13.6%	16.2%	15.8%	15.9%	15.4%

APPENDIX F3

Base Property Consultants – Phase 1 ESA



Bifröst

Environmental and Remediation Services Inc.

Phase One

Environmental Site Assessment

Of

W ½ Sec 2, SE Sec 2 , SE Sec 3 Twp 33 Rge 1 W5M

Olds, Alberta



Prepared For : **Brown & Associates Planning Group**
Prepared By : Base Property Consultants Ltd.
Date: April 30, 2008

Executive Summary

A Phase One Environmental Site Assessment was completed for an agricultural acreage property located east of Olds, Alberta in Mountain View County. Past and present uses of the property have been agricultural and country residential.

Because the farmstead buildings on the SW2 were built after 1995 they are not likely to contain any regulated substances such as lead-based paints, asbestos containing construction materials and fluorescent light fixtures with PCB's in their ballast. An AST was observed on the SW2 farmstead but no above ground fuel storage tanks (ASTs) were observed on the SE2, they may have been on that property in the past. When the AST on the SW2 is no longer required and when the SE2 is redeveloped, should any stained or noxious soil be encountered during site development then Base Property Consultants Ltd. should be contacted to determine the appropriate use of this material. No obvious signs of uncontrolled dumping were observed during the site reconnaissance. Historical air photos show a surface disturbance at the northwest corner of the SW 2 in 1988 and 1990. No obvious sign of this disturbance was noted during the site reconnaissance. Should any buried foreign materials, buried organic soil, stained or noxious smelling soil be encountered during site development then Base Property Consultants Ltd. should be contacted to conduct further investigation.

No obvious sign of the former farmstead buildings on the SE2 was observed during the site reconnaissance. Heating fuel oil facilities, demolition refuse, burn or garbage pits are typical features of country residences. No obvious sign of such facilities were observed during the site reconnaissance. Should any buried foreign materials, buried organic soil, stained or noxious smelling soil be encountered during site development then Base Property Consultants Ltd. should be contacted to conduct further investigation.

Alberta Environment's Groundwater Information Website indicates 26 water wells on the ¼ sections of land which include the subject site. Only two water wells were observed during the site reconnaissance of the subject site plus three septic sewer systems. Other water wells may be present. When these services are no longer required they must be reclaimed in an appropriate manner. A review of the documents presently available from Municipal and Provincial agencies contacted show no records of impairment or

environmental violations pertaining to the subject site. An oil and gas database for this part of Alberta shows an oil and gas well and pipeline on the NW2 and a well to the south of the SE3. An oil and gas battery is to the east of the NW2. Development seatbacks may apply to these facilities. An abandoned oil and gas well is on the SE3. Sumps or pits associated with this well may be present and could impact soil and groundwater conditions on the subject site. A service station has operated adjacent to the southeast property line of the SE2 since at least 1966. Over that period of time leaks or spills of fuel may have occurred which could impact the soil and/or shallow groundwater on the SE2. Other adjacent properties appear to be maintained in a reasonable manner and do not pose obvious environmental concerns at this time.

Therefore, based upon the results of the historical records review, site reconnaissance and information available to the author at the time of preparing this report, it is our opinion that the potential for environmental impairment exists on the subject site. The sources of the potential impacts are the abandoned oil and gas well lease on the SE3 and the service station adjacent to the SE2. Further environmental investigation is recommended.

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1.0 INTRODUCTION

1.1 General

Base Property Consultants Ltd. conducted a Phase One Environmental Site Assessment (ESA) for an acreage property located east of Olds, Alberta in Mountain View County. The objective of this investigation is to identify and evaluate potential environmental liabilities associated with past and current activities on the site. It is understood that this ESA report may form part of a proposed land use application.

1.2 Authorization

Mr. Greg Brown of Brown & Associates Planning Group provided written authorization to proceed with the Assessment on January 29, 2008.

1.3 Scope of Work

This investigation follows protocols as outlined by CSA Z768-01. The scope of this Phase One ESA includes the following:

- undertake a historical review of the subject and adjacent properties using such documents as Land Titles for previous ownership, air photos, records kept by Municipal and Provincial Governments pertaining to land use and environmental compliance.
- undertake a site reconnaissance noting any potential building hazardous materials (using no destructive sampling methods), present physical features, site surface drainage, location and identification of any obvious surface dump material and any obvious drainage sumps or standing water existing on site. This investigation does not address mould issues on the premises.
- note obvious past and present adjacent land uses that may be an environmental concern to the subject site.
- evaluate data collected for potential on-site environmental liability and prepare a final document expressing comments and opinions based on this investigation.

2.0 Site Attributes

2.1 Location and Legal Description

The legal description for the property includes portions of the Northwest and Southeast ¼'s of Section 2, the Southeast ¼ of Section 3 all in Township 33 Range 1 West of the Fifth Meridian, Lot 1 Block 2 Plan 0611022 and Lot 2 Block 2 Plan 0611833. For the purposes of this investigation specific reference to a quarter section on the subject site will be made using SE2 to refer to the SE ¼ of 2-33-1-5. Lot 1 and Lot 2 will be referred to by the ¼ section they are both located in, SW2. The ¼ sections are contiguous and are approximately 228.4 ha in area. Figure One shows the location of the property relative to Olds and Figure Two shows a site plan. All figures are presented in Appendix A.

2.2 Site Geography and Land Use

The subject agricultural acreage property is located 2.4 km east of Olds, Alberta. Site buildings include a house, quonset/green house and two animal shelters on the SW2, a detached double garage, mobile home and an animal shelter on the SE3. The remainder of the property is agricultural land. Topographical relief across the site is approximately 8 meters dropping down to the southeast. Site vegetation is stubble from last season's grain crop, a wood lot (aspen and willows) is on the southeast corner of the NW2 and planted trees, shrubs and grass are around the farmsteads in the SW2 and SE2. Alberta Environment's Groundwater Information Website has record of 11 water wells drilled in the NW2, 3 water wells in the SW2, 10 water wells in the SE2 and 2 water wells in the SE3. Macintosh Lalani Engineering Ltd. (MLEL) completed a geotechnical for the subject site in February 2008. Natural soil observed in the investigation was silty clay till and some sand with sandstone bedrock at approximately 6.7 m below the ground surface. Road access to the property is from the south property line at the Hwy 27 service road for the SE2, Range Rd 1.2 at the west property line of the SW2 and NW2 and the east property line of the SE3. Adjacent land uses are agricultural to the north, east and south of Section 2, west of SE3 and north of SE2; a golf course north of SE3, a service station to the southeast of the SE2, a country residential subdivision west of NW2 with country residences south of SE3 and SW2 and north of SE2.

3.0 Site History

3.1 Historical Land Title Search

A land title search was conducted by the Alberta Attorney General Land Title Office to determine historical property ownership. Copies of title resulting from this search are on file with Base Property Consultants Ltd. and can be reviewed upon request. Since 1945 numerous individuals and limited companies have been listed as owners of the property. Caveats by an oil and gas company were registered on title for the SE3 indicating the potential presence of pipelines or oil and gas wells. Facilities such as pipelines, oil and gas wells represent potential sources of environmental concern to the subject site.

3.2 Aerial Photography

Air photos from 1950 to 2006 were obtained from Alberta Sustainable Resource Development and the Maps and Air Photo Department of the MacKimmie Library, University of Calgary and reviewed to determine previous activities on the site and adjacent land uses. A detailed description of the air photo analysis is presented in Table One, Appendix B. In summary, the subject sites were agricultural (crop and pasture) until between 1998 and 2006 when a portion of the NW2 outside the study area was subdivided into residential acreages. A service station has been adjacent to the southeast corner of the SE2 since at least 1966.

3.3 Municipal Directories and Archives

A search of the Alberta Energy & Utility Board oil and gas well database for this portion of Alberta indicates that an oil gas well was directionally drilled off-site from the NE2 to the NW2 in 2004 but is not in production. A natural gas pipeline crosses the northeast corner of the NW2. This pipeline is not rated to carry any hydrogen sulfide. These facilities are operated by Verro Energy Inc. A well was drilled and abandoned in 1978 on the SE3. No production was associated with this well. An active oil and gas well is approximately 600m to the south of the SE3 and an oil and gas battery is adjacent to the east-central portion of the NW2. Development setbacks may apply to these on-site and off-site facilities. Alberta Environment's Groundwater Information Website indicates 11

water wells drilled in the NW2, 3 water wells in the SW2, 10 water wells in the SE2 and 2 water wells in the SE3. Their exact locations are not given.

3.4 Historical Synopsis

Based upon the compilation of information from land titles and air photos, the historical land uses for the subject site and adjacent properties have been agricultural and country residential. An oil and gas well was drilled and abandoned on the SE3 in 1978.

3.5 Government Documents

Correspondence with and document reviews of various provincial and municipal departments has yielded the following information for the site. Copies of the correspondence received can be found in Appendix C.

- Alberta Environment, Freedom of Information and Protection of Privacy Division – have not identified any records for the subject site.
- Alberta Environment, Authorizations & Approvals – no records for the NW2 and SE2. A Water Act registration by a previous farm owner does exist for the SW2 and an approval to construct a pipeline is registered on the SE3.
- Mountain View County – have no environmental records pertaining to the subject site but do note the presence of a service station on the southeast corner of the SE2.

4.0 Site Reconnaissance and Interviews

The author conducted a site reconnaissance on March 31, 2008. The subject agricultural acreage property is located 2.4 km east of Olds, Alberta (Photos One to Four). All photographs are presented in Appendix C. Site buildings include a house, quonset/green house and two animal shelters in the SW2, a detached double garage, mobile home and an animal shelter in the SE3. The remainder of the property is agricultural land. Topographical relief across the site is approximately 8 meters dropping down to the southeast. Site vegetation is stubble from last season's grain crop, a wood lot (aspen and

willows) in the southeast corner of the NW2 and planted trees, shrubs and grass around the farmsteads in the SW2 and SE2. The wood lot has a dugout at its southeast corner. There were no obvious signs of uncontrolled dumping observed on the property.

An oil and gas battery is adjacent to the east-central property line of the NW2. No obvious sign of water wells were noted on either the NW2 or SE3. The water wells registered with Alberta Environment for the NW2 may be associated with the country residences on the NW2 that are excluded from the study area. No obvious sign of the abandoned oil and gas well was noted on the SE3.

The farmstead on the SW2 is serviced by a water well and two septic sewer systems. The house has an attached double garage. Windows in the house are construction date stamped 1996. The quonset/greenhouse includes a mezzanine residence. The quonset has a gravel floor with no floor pits or drains. The greenhouse has floor drains connected to an external dry well to the south. A steel dumpster is located between the house and quonset and is used for solid waste disposal. Two dugouts are located north and south of the house. These dugouts collect surface drainage water and water from pipes draining a slough area to the north. A steel above ground fuel storage tank (AST – approximately 454 l) is located northwest of the quonset. No obvious spills or leaks were noted beneath this tank.

The farmstead on the SE2 is serviced by a septic system and water well. No obvious signs of refuse or burn pits was observed. The detached garage was not available for viewing. No obvious signs of the former farmstead buildings was observed. The service station to the southeast of the SE2 has underground storage tanks (UST's).

Mr. Lee Martin P. Eng. of Macintosh Lalani Engineering Ltd. (MLEL) was interviewed on March 31, 2008. MLEL completed a geotechnical investigation for the subject site in February 2008. Mr. Martin indicated that borehole observations recorded site natural soil to be silty clay till and some sand with sandstone bedrock at approximately 6.7 m below the ground surface at some locations.

Road access to the property is from the south property line at the Hwy 27 service road for the SE2, Range Rd 1.2 at the west property line of the SW2 and NW2 and the east property line of the SE3. Adjacent land uses are agricultural to the north, east and south of Section 2, west of SE3 and north of SE2; a golf course north of SE3, a country residential subdivision west of NW2, a service station to the southeast of the SE2 with country

residences south of SE3 and SW2 and north of SE2. Adjacent properties exhibit reasonable levels of maintenance.

5.0 Environmental Site Assessment

Because the farmstead buildings on the SW2 were built after 1995 they are not likely to contain any regulated substances such as lead-based paints, asbestos containing construction materials and fluorescent light fixtures with PCB's in their ballast. An AST was observed on the SW2 farmstead but no above ground fuel storage tanks (ASTs) were observed on the SE2, they may have been on that property in the past. When the AST on the SW2 is no longer required and when the SE2 is redeveloped, should any stained or noxious soil be encountered during site development then Base Property Consultants Ltd. should be contacted to determine the appropriate use of this material. No obvious signs of uncontrolled dumping were observed during the site reconnaissance. Historical air photos show a surface disturbance at the northwest corner of the SW 2 in 1988 and 1990. No obvious sign of this disturbance was noted during the site reconnaissance. Should any buried foreign materials, buried organic soil, stained or noxious smelling soil be encountered during site development then Base Property Consultants Ltd. should be contacted to conduct further investigation.

No obvious sign of the former farmstead buildings on the SE2 was observed during the site reconnaissance. Heating fuel oil facilities, demolition refuse, burn or garbage pits are typical features of country residences. No obvious sign of such facilities were observed during the site reconnaissance. Should any buried foreign materials, buried organic soil, stained or noxious smelling soil be encountered during site development then Base Property Consultants Ltd. should be contacted to conduct further investigation.

Alberta Environment's Groundwater Information Website indicates 26 water wells on the ¼ sections of land which include the subject site. Only two water wells were observed during the site reconnaissance of the subject site plus three septic sewer systems. Other water wells may be present. When these services are no longer required they must be reclaimed in an appropriate manner. Water wells to be abandoned will need to be reclaimed as per Alberta Environmental Protection and Enhancement Act Water Well Regulation (Twelve3/93). This would include but not be limited to the removal of the casings, grouting or sealing the producing zone and backfilling with clean material. Septic

system reclamation would include; septic tank contents being taken to a landfill site for disposal, the tank and associated piping disposed of properly and the soil in the septic field sampled and analyzed for metals and organic solvents to ensure that any such contaminants that may be present are dealt with appropriately. It is suggested that the soil in the septic fields be allowed to remediate itself prior to mixing with other loam. The removal of the septic field laterals require some excavation which will start the remediation process by aerating the fields.

A review of the documents presently available from Municipal and Provincial agencies contacted show no records of impairment or environmental violations pertaining to the subject site. An oil and gas database for this part of Alberta shows an oil and gas well and pipeline on the NW2 and a well to the south of the SE3. An oil and gas battery is to the east of the NW2. Development seatbacks may apply to these facilities. An abandoned oil and gas well is on the SE3. Sumps or pits associated with this well may be present and could impact soil and groundwater conditions on the subject site. A service station has operated adjacent to the southeast property line of the SE2 since at least 1966. Over that period of time leaks or spills of fuel may have occurred which could impact the soil and/or shallow groundwater on the SE2. Other adjacent properties appear to be maintained in a reasonable manner and do not pose obvious environmental concerns at this time.

Therefore, based upon the results of the historical records review, site reconnaissance and information available to the author at the time of preparing this report, it is our opinion that the potential for environmental impairment exists on the subject site. The sources of the potential impacts are the abandoned oil and gas well lease on the SE3 and the service station adjacent to the SE2. Further environmental investigation is recommended.

6.0 Environmental Site Assessment Liability Limitations

Since the assessment was conducted on the dates presented within this report the conditions prevalent and noted at this time must be recognized as having a limited life. Should activities be introduced or practices change, either of which may not be deemed to comply with generally accepted environmental practices, the site conditions would be altered sufficiently for this report to be invalid.

Recommendations, comments and opinions presented herein are based on a Phase One Environmental Site Assessment as described in the Scope of Work included in Section

One of this report. The report has been prepared in accordance with generally accepted environmental practice and no other warranty is made, either express or implied. Distribution of this report beyond the client is only at the mutual agreement of both the client and the author and is not assignable.

7.0 Closure

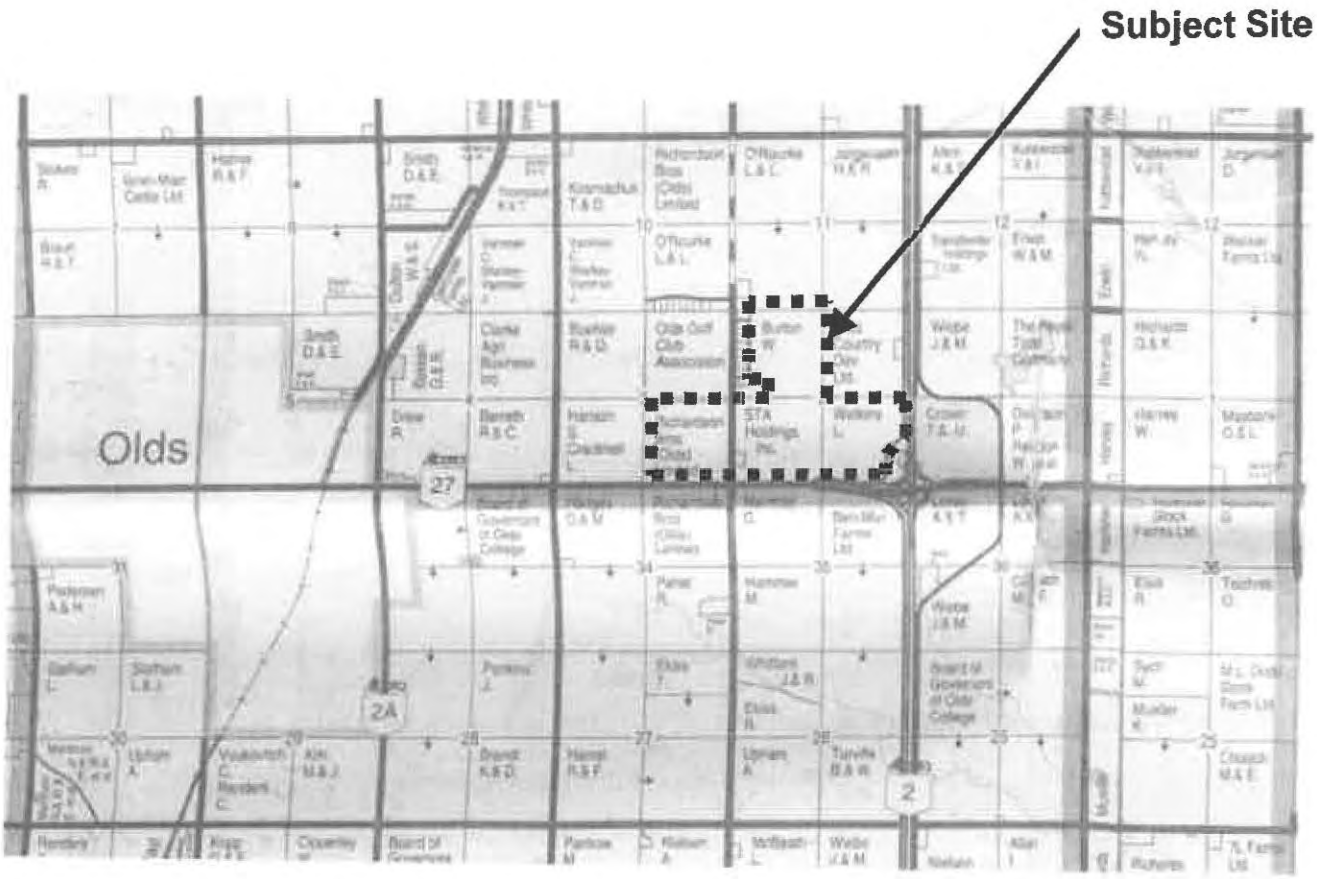
This report is respectfully submitted to Mr. Greg Brown of Brown & Associates Planning Group for your review. We trust that it meets your present needs. Should you have any questions please do not hesitate in contacting us.

Respectfully submitted,

Brian Chikmoroff P. Eng.
Environmental Consultant

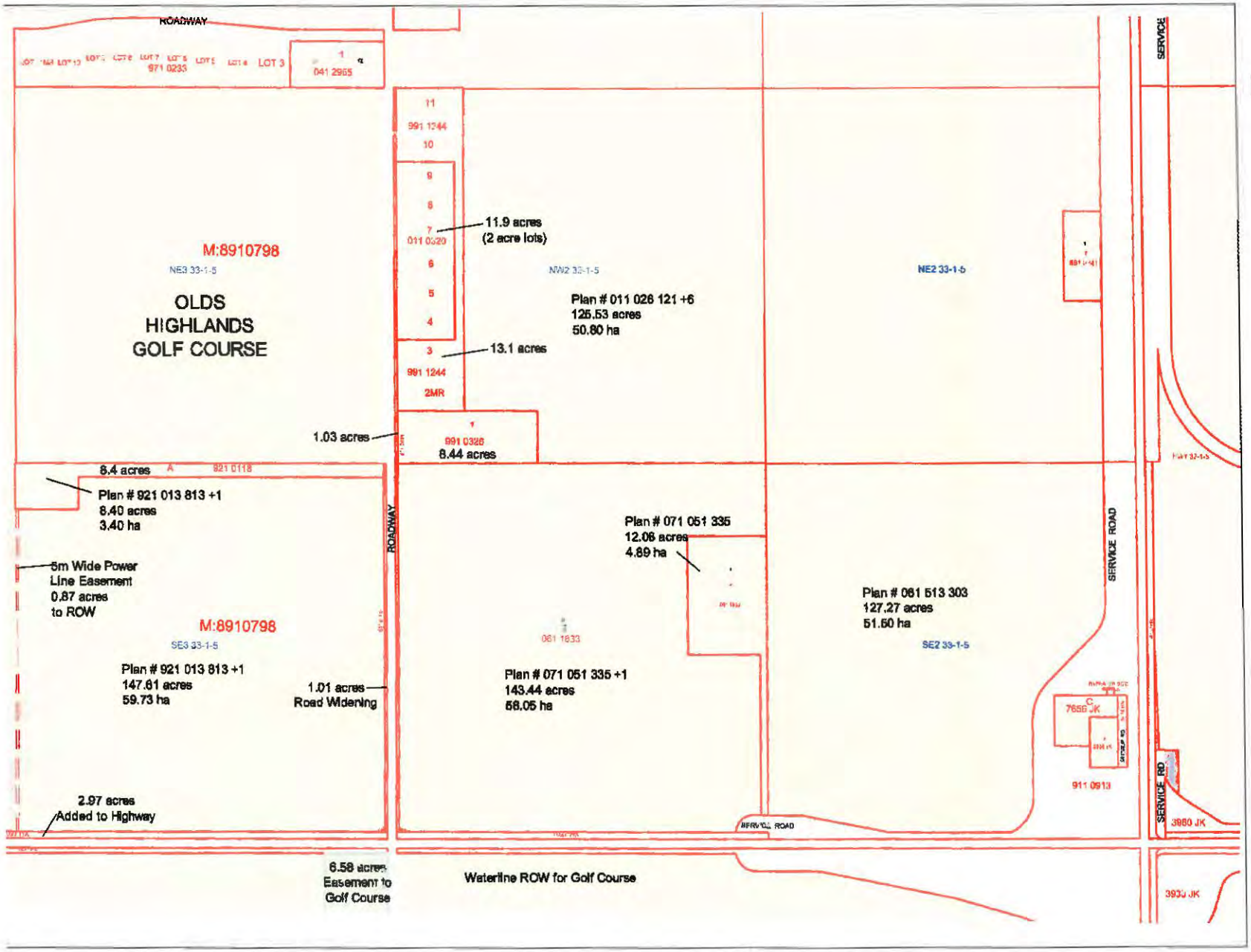
PEY
BASE
Signature B Chikmoroff
Date Apr 30, 2008
PEP
The Asso
Geologists

Appendix A: Figures



N

Figure One



MOUNTAINVIEW MEADOWS BUSINESS PARK & RESIDENTIAL COMMUNITY

Legal Descriptions

brown & associates

January 2008

Appendix B: Air Photo Analysis

Table One: Air Photo Analysis

Year	Scale	Location	Land Use-Subject	Land Use – Adjacent
1950	1:40,000	All	Agricultural, country residences on the southwest of SE2 and the southwest of the NW2 but outside the study area	NSEW is agricultural, Hwy 27 at south property line of S ½ 2 and SE3, Rge Rd 1.2 at the east property line of the SE3 and west property line of the W ½ 2, country residences are to the south of the SE3 and SW2 and east of the NW2
1966	1:31,680	SE2	Hwy 2 is to the east of the SE2	A service station is adjacent to the southeast corner
1970	1:80,000	All	No change	No change
1975	1:24,000	SE2	No change	A dugout is between the SE2 and the service station
1977	1:71,000	NW2	A dugout is at the southeast corner,	A golf course is to the west (north of SE3)
1982	1:60,000	All	No change	No change
1988	1:30,000	SW2	A country residence site is being prepared on the southeast portion a surface disturbance is visible at the northwest corner	No change
1990	1:20,000	SW2	A house is on the southeast corner	No change
1998	1:30,000	SW2 and NW2	A quonset is east of the house on SW2 and a road has been built at the west edge of NW2 outside the study area	No surface disturbance is visible on the northwest corner of the SW2
2006	1:20,000	NW2	No change	A country residential subdivision is adjacent to the west property line of the NW2 and an oil and gas facility is to the east

Appendix C: Correspondence

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FOIP, Records and
Corporate Support Branch

6th Floor, Petroleum Plaza South
9915 – 108 Street
Edmonton, AB T5K 2G6

Telephone: (780) 427-4429
Fax: (780) 427-9838

Mr. Brian Chikmoroff
Base Property Consultants Ltd.
45 Deer River Green SE
Calgary, AB T2J 7A2
403

[Fax:] (403) 278-9738

February 07, 2008

Dear Mr. Chikmoroff:

Re: Routine Disclosure Request 0269-RD-08 for information routinely available under the Environmental Protection and Enhancement (EPEA) Legislation.

Our office received your request dated February 05, 2008 for the following subject records.

Location : **NW & S ½ Sec 2-Twp 33-Rge 01 W5M, Olds, AB**
SE Sec 3-Twp 33-Rge 1 W5M
Plan 061 1833 Block 2 Lot 2

Name(s): **None Provided**

Time Frame: **Historical Search**

Records: **Scientific/technical information which may include reports documenting the nature and extent of soil, ground and surface water contamination; remedial measures taken to clean-up the site or status of the site; and external correspondence between the submitter and the Department of Environment pertaining to the reports.**

Alberta Environment has conducted a search of department records; based on the search parameters you provided to this office and has not identified any routinely available records relating to the subject of your request. As a result of our findings, your Routine Disclosure request has been closed.

Enclosed is a receipt for the initial fee in the amount of $25.00, submitted to Alberta Environment to undertake your request for a search for these records.

If you have any further questions or concerns, please write or call me at (780) 427-0271.

Yours truly,

(Miss) Culyer

Emily Culyer,
Administrative Assistant

Enclosure (Receipt Visa 5 468)

FAXED FEB 07 2008

protection & enforcement

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Last Update/Review: **April 1, 2000**

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Document 00174199-00-00 OLDS/REGISTRATION/BURTON BLAIR - F00174199 is held by Blair Burton, under the provisions of the *Water Act*. This registration is currently issued as of Mar. 25, 2002 and does not expire.

Record 1

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Last Update/Review: **April 1, 2000**

Authorization /Approval Viewer

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Authorization / Approval Viewer Help

The search used the following values:

Legal Land Location: M: 5 Rge: 1 Twp: 33 Sec: 3 QS: SE

Show Inactive Authorizations / Approvals: No

The resulting Authorizations / Approvals based on the search criteria will be displayed below. A 📄 will appear next to the Authorization / Approval when documentation is available for viewing or downloading. **Please click** Authorization / Approval Viewer Help **if you encounter problems viewing the approval document.**

The documents referenced from this page are in Adobe Acrobat Writer (.pdf) format.

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📄 Document 00223038-00-00 LONEPINE WEST TORRINGTON GATHERING SYSTEM PIPELINE PROJECT is held by Apache Canada Ltd., under the provisions of the *Environmental Protection & Enhancement Act.* This approval is currently issued as of Jan. 17, 2006 and expires on Jan. 16, 2011.

Record 1

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APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended

APPLICATION NO. 001-223038

APPROVAL NO. 223038-00-00

EFFECTIVE DATE. January 17, 2006

EXPIRY DATE. January 16, 2011

APPROVAL HOLDER. Apache Canada Ltd.

Pursuant to Division 2, Part 2, of the Environmental Protection and Enhancement Act, R.S.A. 2000, c.E-12, as amended, approval is granted subject to the attached terms and conditions for the following activity:

the construction and reclamation of a pipeline being the Lonepine / Torrington Gas Gathering System Pipeline Project.

Designated Director under the Act
David L. Ardell, P. Eng.

Date signed January 17, 2006

Mountain View
COUNTY

April 24, 2008

Attention: Brian M. Chikmoroff P. Eng.
Base Property Consultants Ltd.
45 Deer River Green S.E
Calgary, Alberta, T2J 7A2

Dear Mr. Chikmoroff:

Re: NW 2, S ½ 2 and SE 3-33-1 W5M

Please be advised that after review of the above property we can confirm that there is no record of any fuel storage tanks, clean-up orders, hazardous materials and/ or spills.

We can verify that there is an active gas station on SE 2-33-1 W5M; however we are unaware of the location of the fuel holding tanks.

Enclosed is the relevant charge for our time researching this information.

Sincerely,

Diana L. Hawryluk, BA, PPS, ACP, MCIP
Director of Planning and Development Services
Mountain View County
Postal Bag 100
Didsbury, AB T0M 0W0
Ph: 335 - 3311

Appendix D: Photographs



Photo One – View of SW2 Farmstead Looking Northwest



Photo Two – View of SE2 Farmstead Looking Southeast



Photo Three – View of SE3 Looking Northwest



Photo Four – View of Dugout in NW2 Wood Lot Looking East

Appendix E: Curriculum Vitae

Brian M. Chikmoroff, P. Eng.

Education

B. Sc. (Civil Engineering) 1985, University of Calgary
B. Sc. (Environmental Biology) 1979, University of Calgary

Expertise

Mr. Chikmoroff has over twenty years expertise in the planning, design, construction and marketing of land for development, management of a land bank in excess of 4000 acres plus hands-on field experience in the environmental areas of water quality sampling, soils sampling and the freeze/thaw modeling of soils.

Mr. Chikmoroff is experienced in environmental site assessments of commercial sites, raw land and residential property, conducting over 700 hundred Phase One, Two and Three Assessments on lands that had undergone varied uses since the late 1800's. He has directed soil investigations for purposes ranging from the search for environmental contaminants through to structural investigations and has participated in water sampling programs searching for and measuring contaminants. On the research side, he has studied the use of biological monitors as a means to track the presence of pollutants in aquatic environments.

Land development experience included the management of over 4000 acres of raw land in the Calgary region. Mr. Chikmoroff has been responsible for the costing, construction, pricing and marketing of residential properties ranging from entry level through to estate properties at a volume of between two to three hundred lots per year. As a part of this development process he has coordinated planning and engineering consultants to obtain provincial and municipal approvals ranging from area structure, outline and tentative plans through to subdivision and permission to construct.

In technical expertise, Mr. Chikmoroff has designed single and multi family subdivisions as well as site services for commercial developments. He has coordinated all aspects of municipal construction projects from site grading through to paving and landscaping. Mr. Chikmoroff has been responsible for materials testing on municipal construction projects.

Experience

1994 to Present	**Base Property Consultants Ltd.**
	President and Senior Environmental Consultant Responsible for Phase One, Two and Three environmental site assessments (ESA's) and environmental property audits (EPA's).
1987 - 1994	**Genstar Development Co.**
	Development Manager/Project Manager Responsible for the management of land bank, development, construction and marketing of residential properties.
1986 to 1987	**Kellam Berg Engineering and Surveys**
	Municipal Design Engineer Responsible for the deep service, roadway and sidewalk design of residential and commercial developments.
1984 to 1985	**Markborough Properties Inc.**
	Field Coordinator Responsible for the management of new and maintenance construction of residential subdivisions.
1979 to 1981	**EBA Engineering Consultants Ltd.**
	Materials Technician/ Engineering Assistant Responsible for geotechnical investigations, materials testing and analytical analysis of data from a geothermal computer model.

Professional Affiliations

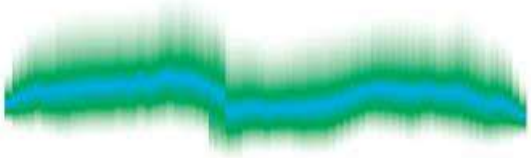
Member, Alberta Professional Engineers, Geologists and Geophysicists Association
Past Member, City of Calgary Environmental Advisory Committee
Past Chairman, Environmental Committee, Urban Development Institute, Calgary Chapter

Presentations

"Residential Land Development and Calgary's New Environmental Policy" (1993)
Conference on Sustainable Development - Faculty of Environmental Design

APPENDIX F4

Base Property Consultants – Phase 2 ESA



Bifröst

Environmental and Remediation Services Inc.

Phase Two

Environmental Site Assessment

Of

SE Sec 2 and SE Sec 3 Twp 33 Rge 1 W5M

Olds, Alberta



Prepared For : **Brown & Associates Planning Group**
Prepared By : Base Property Consultants Ltd.
Date: October 24, 2008

Executive Summary

A Phase Two Environmental Site Assessment (ESA) was completed for an agricultural acreage property located east of Olds, Alberta in the Municipal District of Mountain View. An abandoned oil and gas well lease is on the SE 3-33-1-5 and a service station is to the east of the SE 2-33-1-5. Drilling activities at the well lease typically include a drilling mud sump and a flare pit which may be potential on-site sources of subsurface contamination. Underground storage tanks (USTs) of fuel at the service station represent possible off-site sources of underground contamination to the subject site. The purpose of this investigation was to determine whether or not hydrocarbons (benzene, toluene, ethylbenzene, xylene and F1 to F4 hydrocarbon components), volatile organic compounds (VOCs) or metal contaminants are present in the soil or shallow groundwater at select points on the subject property.

Thirty-seven boreholes were advanced for subsurface investigation of existing soil and groundwater conditions. Thirty-three of these boreholes were shallow (2m in depth) and the remainder were between 7 and 10 m deep. Shallow boreholes in a 15 m grid pattern near the abandoned well head location were used to search for the sump, flare pit and well head. Natural soil in the area was observed on-site to be silt and clay till with traces of sand. An underlying layer of sandstone and siltstone bedrock was observed between 6 and 9 m below the surface. The approximate position for the wellhead was drilled (E3) but no evidence of a steel standpipe or concrete was encountered in that area. For future development of the property, the well head will have to be located for setback purposes. This would be most efficiently done at the surface grading stage of construction. No foreign material, visible staining or olfactory evidence of hydrocarbons were noted in any of the boreholes. Fill soil consisting of sand, silt and clay observed north of the approximate wellhead location (E9) could be the drilling sump. Monitoring wells were installed at E1, E3 and E9 to allow for shallow groundwater sampling. Borehole E3 produced sufficient groundwater for sampling. No evidence of a flare pit was encountered at any of the boreholes on the well lease.

Soil samples were collected from E1, E2, E3 and E9 and qualitatively sampled for hydrocarbon vapors. Recorded levels of hydrocarbons ranged from 10 to 520 PPM. The 520 PPM readings at E1 could possibly be indicative of hydrocarbon contamination. Three disturbed soil and one shallow groundwater sample were collected and sent to the laboratory for chemical analysis. No hydrocarbon or VOCs measured exceeded the

Alberta Environment criteria for residential land use. Elevated manganese in the groundwater sample is not deemed significant in the context of this investigation because its guideline is primarily an aesthetic one for drinking water.

Therefore, based upon the results of the site drilling investigation, soil and groundwater sampling program it is our opinion that no significant hydrocarbon, VOC or metals impairment exists at the selected sample points on the subject site. Further environmental investigation is not required at this time.

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1.0 INTRODUCTION

1.1 Background

A Phase Two Environmental Site Assessment (ESA) was completed for an agricultural acreage property located east of Olds, Alberta in the Municipal District of Mountain View. A previous Phase One ESA by Base Property Consultants Ltd. in April 2008 noted an abandoned oil and gas well lease on the SE 3-33-1-5 and a service station adjacent to he SE 2-33-1-5. Drilling activities at the well lease could include a drilling mud sump and a flare pit which may be potential on-site sources of subsurface contamination. Underground storage tanks (USTs) of fuel at the service station represent possible off-site sources of underground contamination to the subject site. The purpose of this investigation was to determine whether or not hydrocarbons (benzene, toluene, ethylbenzene, xylene and F1 to F4 hydrocarbon components), volatile organic compounds (VOCs) or metal contaminants are present in the soil or shallow groundwater at select points on the subject property.

1.2 Authorization

Mr. Greg Brown of Brown & Associates Planning Group provided written authorization to proceed with this Assessment on June 16, 2008.

1.3 Scope of Work

The scope of this Phase Two ESA was to identify the abandoned oil and gas well location and to note whether any subsurface metals, VOCs or hydrocarbon contamination is present in soil or groundwater at select locations on the well lease and adjacent to the service station site. The well head location would be approximated in the field using information from an Alberta Energy and Utility Board database. Drilling at the well head itself and in a 15 m grid pattern around the well head would be undertaken to confirm the location of the well head and to possibly locate any drilling mud sump or flare pit. Select disturbed soil samples would be qualitatively analyzed in the field for hydrocarbon vapors using an RKI Eagle Combustible Vapor Monitor with methane response off. Selection of sampling points was based upon proximity to the recorded location of the abandoned oil and gas

well lease and adjacent to the off-site service station location. Assessment criteria to which analytical results are compared are Alberta Tier 1 Soil and Groundwater Remediation Guidelines, 2008 Alberta Environment.

2.0 Soils and Groundwater Investigation

2.1 Site Description

The legal description for the property includes portions of the Southeast ¼'s of Section 2 and the Southeast ¼ of Section 3 all in Township 33 Range 1 West of the Fifth Meridian. For the purposes of this investigation specific reference to a quarter section on the subject site will be made using SE2 to refer to the SE ¼ of 2-33-1-5. Approximate area of the two ¼'s is 111.73 ha. Figure One shows the location of the site relative to Olds while Figure Two shows the site plan. All figures are presented in Appendix A.

The subject agricultural acreage property with no buildings is located 2.4 km east of Olds, Alberta. Topographical relief across the site is approximately 8 meters dropping down to the southeast. Site vegetation is planted canola on the SE2 and hay on the SE3. Alberta Environment's Groundwater Information Website has record of 10 water wells in the SE2 and 2 water wells in the SE3. Macintosh Lalani Engineering Ltd. (MLEL) completed a geotechnical for the subject site in February 2008. Natural soil observed in their investigation was silty clay till and some sand with sandstone bedrock at approximately 6.7 m below the ground surface. Road access to the property is from the south property line at the Hwy 27 service road for the SE2, Range Rd 1.2 at the east property line of the SE3. Adjacent land uses are agricultural to the north and west of SE2; west, south and east of SE3; a golf course north of SE3, a service station to the east of the SE2, new construction south of SE2 with country residences south of SE3 and north of SE2.

2.2 Sampling Method

This Phase Two ESA investigation included thirty-seven boreholes (E1 to E37), the locations of which are shown in Figures Two and Three. Albert One Call provided buried utility locations prior to commencing drilling.

Boreholes were made using a mobile solid stem auger drill rig with a 100-mm diameter auger. Disturbed soils samples were logged at approximately 1.0-meter intervals and select samples placed in plastic bags for headspace hydrocarbon vapor field monitoring. Three soil samples were collected, placed in 250-ml glass jars, stored in a cooler and transported to the lab for analysis. The Chain of Custody documentation can be found in Appendix C. The samples were selected based upon field vapor readings. A summary table of the borehole logs is presented in Appendix B.

Three, 50-mm diameter threaded PVC pipe groundwater monitoring wells were installed at borehole E1, E3 and E9 the location of which is shown in Figure Two. Horizontally machine slotted screen portions of standpipe were installed at the bottom of the wells with the remainder of the standpipe solid, each well fitted with solid end caps. The wells were backfilled with sil-9 sand to approximately 0.5 meters below the surface and then capped with 0.5m of bentonite. A steel casing with locking cap was placed over the monitoring wells for security.

An unfiltered groundwater sample would be collected from the monitoring wells producing water after bailing three times the volume of water that had collected in the well. The groundwater samples would then be placed in appropriate containers and transported to the laboratory in a cooler for laboratory analysis. The lab would receive the samples within one hour of sampling. Chain of Custody documentation can be found in Appendix C.

2.3 Drilling Results

The drilling and soil sampling program was undertaken at the site on August 25, 2008. The abandoned oil and gas lease was approximated in the field using Alberta Energy and Utility Board site drawings and marked prior to drilling. The first borehole on the SE3 lease – E3, was advanced at the approximated well head location with the next 34 boreholes radiating outwards in a 15 m grid. Boreholes E1 and E2 were drilled on the SE2 at two locations immediately west of the off-site service station property.

Thirty-seven environmental investigative boreholes were advanced up to a maximum depth of 10 meters. Natural soil observed on the site was loam overlying silt and clay till with traces of sand and gravel. An underlying layer of sandstone and siltstone bedrock was encountered between 6 and 9 m below the ground surface (bgs). No foreign material, visible staining or olfactory evidence of hydrocarbons was noted in any of the boreholes. Fill soil consisting of silt, sand and clay was encountered in the upper 4 m of boreholes E8, E9 and E11 indicating the potential location of the drilling mud sump. Monitoring wells were installed at E1, E3 and E9, nearest the service station (E1), near the well head location (E3) and in the fill area (E9). Groundwater was initially measured at 4.0 meters below the ground surface (bgs) at E3. No obvious evidence of a flare pit or well head was encountered at the well lease.

Qualitative readings of hydrocarbons from disturbed soil samples are recorded on the borehole logs. The levels recorded ranged between 10 PPM and 520 PPM. The 520 PPM reading is potentially indicative of hydrocarbon contamination.

2.4 Laboratory Results

Native soil observed in the boreholes was clay till therefore a fine-grained particle size for the conservative residential land use was used with the Alberta Tier One Guidelines. Hydrocarbon laboratory analysis results are presented in Appendix C and summarized in Table One with the guidelines. No hydrocarbons or VOC's exceeded the selected criteria. Metals laboratory analysis results are presented in Appendix C and summarized in Table Two with the guidelines. No metals in soil exceeded the selected criteria. Elevated manganese in the groundwater sample is not deemed significant in the context of this investigation because its guideline is primarily an aesthetic one for drinking water.

Table One Hydrocarbon Measurements (all values in PPM)

	Benzene	Toluene	Ethylbenzene	Xylene	F1	F2	F3	F4
AE Soil Residential	0.046	0.52	0.11	15	210	150	1300	5600
E1 8m bgs soil	<0.02	<0.02	<0.02	<0.02	<0.1	<10	316	222

Table Two Metals Measurements (all Values in PPM)

	E3 8m bgs soil	E9 5m bgs soil	E3 Water	AE Soil Residential	AE GW Residential
Arsenic	5.1	5.6	<0.01	17	0.005
Barium	220	199	0.056	500	1
Beryllium	<0.6	<0.6	<0.002	5	NG
Boron	NA	NA	0.278	2	5
Cadmium	0.2	0.2	<0.004	10	0.005
Chromium	19.3	19.3	<0.002	64	0.05
Cobalt	7.3	7.2	<0.004	20	NG
Copper	21.9	20.2	<0.004	63	1
Lead	12.6	12.0	<0.005	140	0.01
Manganese	NA	NA	**0.802**	NG	.05
Mercury	<0.5	<0.5	NA	6.6	.001
Molybdenum	0.4	<0.2	0.009	4	NG
Nickel	21.4	20.3	<0.007	50	NG
Selenium	<0.5	<0.5	<0.007	1	0.001
Silver	<0.5	<0.5	0.005	20	.1
Thallium	<0.5	<0.5	<0.03	1	NG
Uranium	NA	NA	<0.025	23	0.02
Vanadium	18.8	19.5	<0.006	130	NG
Zinc	66.4	60.9	0.008	200	0.03

NA = Not Analyzed

NG = No Guideline

3.0 Environmental Site Assessment

The approximated location for the wellhead was drilled but no evidence of a steel standpipe, concrete or fill soil was encountered in that area. For future development the well head will have to be located for setback purposes. This would be most efficiently done at the surface grading stage of construction. Therefore, based upon the results of the site drilling investigation, soil and groundwater sampling program it is our opinion that no

significant hydrocarbon, VOCs or metals impairment from on-site or off-site sources exists at the selected sample points on the subject site. Further environmental investigation is not required at this time.

4.0 Environmental Site Assessment Liability Limitations

Since the assessment was conducted on the dates presented within this report the conditions prevalent and noted at this time must be recognized as having a limited life. Should activities be introduced or practices change, either of which may not be deemed to comply with generally accepted environmental practices, the site conditions would be altered sufficiently for this report to be invalid.

Recommendations, comments and opinions presented herein are based on a Phase Two Environmental Site Assessment as described in Section 1.3 - the Scope of Work. Sample points were selected based on proximity to known sources of potential contaminants. The report has been prepared in accordance with generally accepted environmental practice and no other warranty is made, either express or implied. Distribution of this report beyond the client is only at the mutual agreement of both the client and the author and is not assignable.

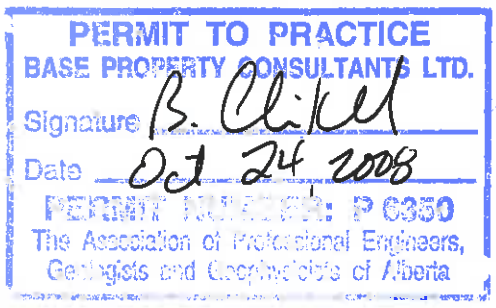
5.0 Closure

This report is respectfully submitted to Mr. Greg Brown of Brown & Associates Planning Group for review and we trust that it meets your present needs. Should you have any questions please do not hesitate in contacting us.

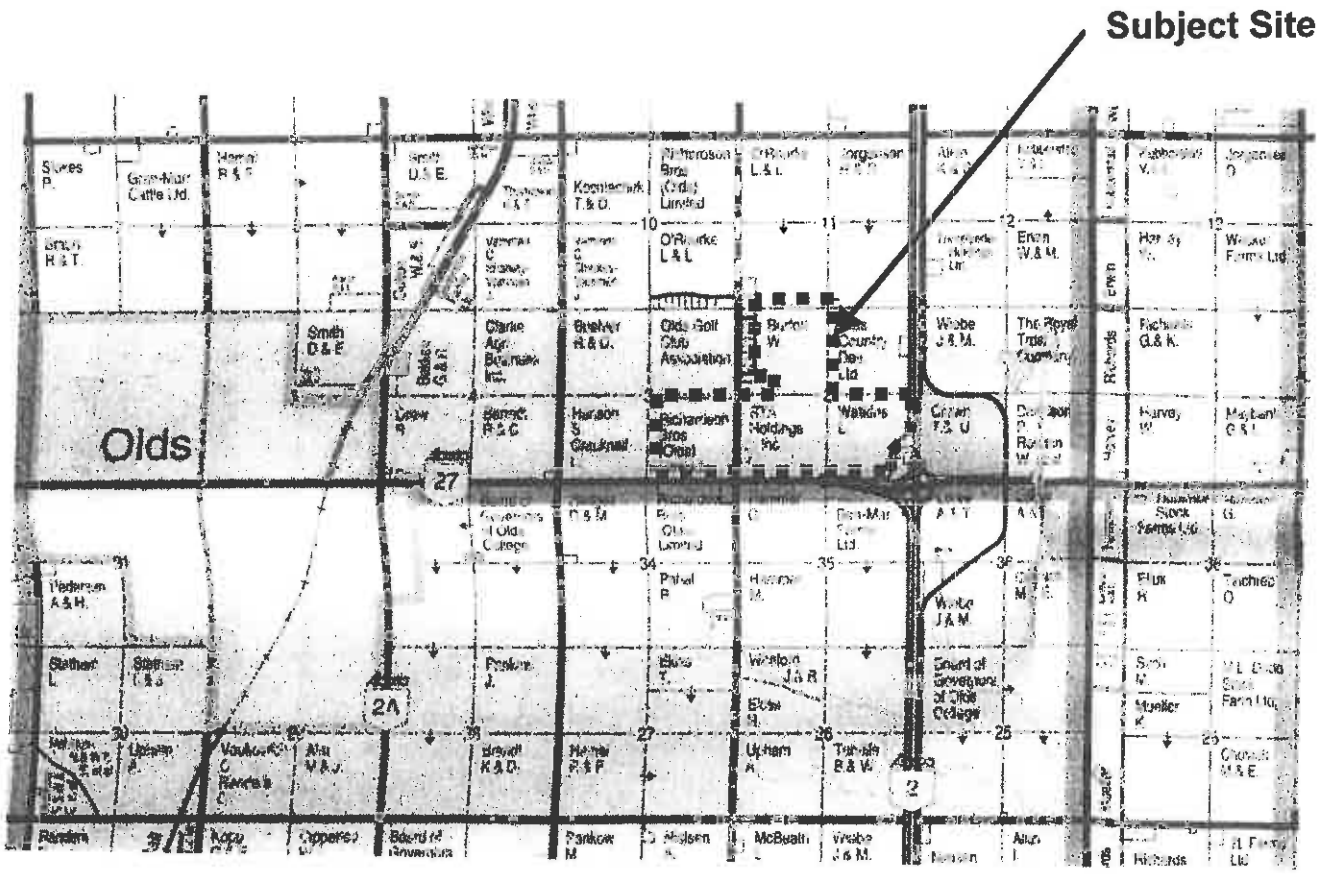
Respectfully submitted,



Brian M. Chikmoroff, P. Eng.
Environmental Consultant

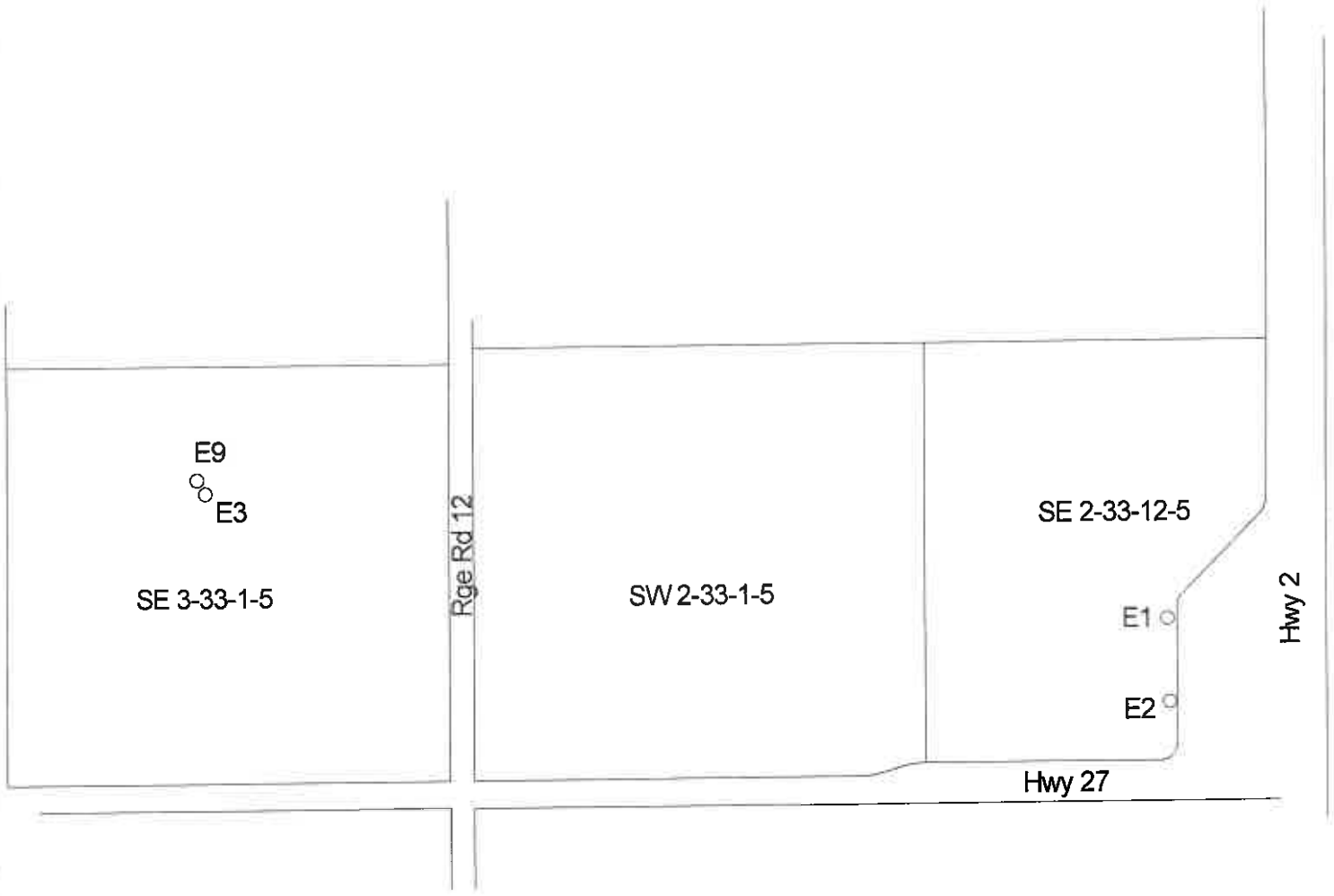


Appendix A: Figures



N

Figure One

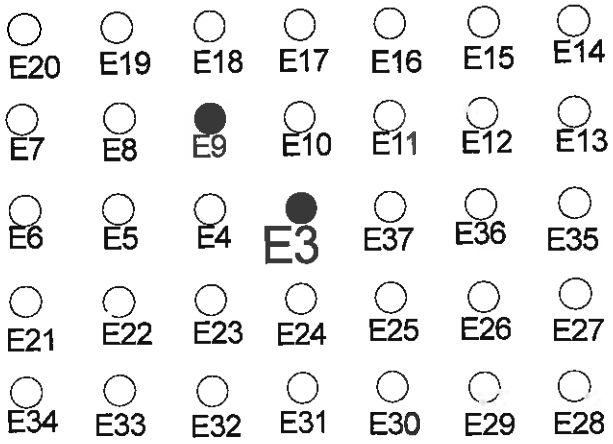


Legend

○ Borehole

N

Client: Brown & Associates Planning Group	Base Property Consultants Ltd.		
Project: Mountian View Meadows, Olds, AB	Date: Oct 24 08	Drawn By: bc	Checked By: BC
Title: SITE PLAN	Scale: nts	Project No.: ESA 872-2	Figure 2



Legend

E12 Borehole

E3 Monitoring Well

Client:	Brown & Associates Planning Group	Base Property Consultants Ltd.		
Project:	Mountain View Meadows Olds, AB	Date: Oct 24/08	Drawn By: bc	Checked By: BC
Title:	Drilling Detail SE 3-33-1-5	Scale: nts	Project No.: ESA 872-2	Figure 3

Appendix B: Bore hole Logs

Soil Borehole Log Summary

Borehole	Description
E4 to E7	Loam 0.1 to 0.2 m over Silt & Sand then Clay Till, olive, moist, hard. Drilled to a depth of 2 m.
E8	Loam 0.1m , Clay and Silt Fill, trace sand to 4.2 m over Clay Till, olive. Drilled to a depth of 4.5 m.
E9 & E10	Loam 0.1 m over Silt & Sand then Clay Till, olive, moist, hard. Drilled to a depth of 2 m.
E11	Loam 0.1m , Silt, Sand & Clay Fill, tr wood chips and rootlets to 4 m over Clay Till. Drilled to a depth of 4.5 m.
E12 to E37	Loam 0.1 to 0.2 m over Silt & Sand then Clay Till, olive, moist, hard. Drilled to a depth of 2 m.

PROJECT: Mountain View Meadows	**BOREHOLE NO. E1**
PROJECT NO.: ESA 872-2	**DRILL TYPE:** Auger
LOCATION: Olds, AB	**ELEVATION:** na
CLIENT: Brown & Associates	

SAMPLE TYPE: ■ SHELBY TUBE ▨ SPLIT SPOON ▩ DISTURBED

DEPTH (m)		SAMPLE TYPE	SAMPLE NO.	Lab Sample	VOC (PPM)	Well Profile
0.0	Grass					
1.0	Sand & Clay Till, lt olive, moist, compact				10	Bentonite
2.0	Clay Till, olive, moist, hard				25	
3.0	Clay Till, olive, moist, hard				70	
4.0	Clay Till, tr sand, olive, moist, hard				100	Sand
5.0	Clay Till, tr gravel, olive, moist, hard				60	Dry
6.0	Clay Till, dk olive, moist, hard				60	
7.0	Clay Till, dk olive, moist, hard				190	
8.0	Clay Till, tr gravel, dk olive, moist, hard		E1-8	X	520	
9.0	Sandstone Bedrock, gray, dry, hard				15	
10.0						
11.0						
12.0						

BASE PROPERTY CONSULTANTS LTD.

GROUNDWATER LEVEL: dry — DATE: Aug 25, 2008

DATE DRILLED: Aug 25, 2008 — LOGGED BY: bc

PAGE 1 of 4

PROJECT: Mountain View Meadows	**BOREHOLE NO. E2**
PROJECT NO.: ESA 872-2	**DRILL TYPE:** Auger
LOCATION: Olds, AB	**ELEVATION:** na
CLIENT: Brown & Associates	

SAMPLE TYPE: ■ SHELBY TUBE ▨ SPLIT SPOON ▩ DISTURBED

DEPTH (m)		SAMPLE TYPE	SAMPLE NO.	Lab Sample	VOC (PPM)	Well Profile
0.0	Grass					
1.0	Silt, olive, moist, firm				10	
2.0	Clay Till, olive, moist, hard				15	
3.0	Clay Till, tr gravel, olive, moist, hard				25	
4.0	Clay Till, tr gravel, olive, moist, hard				20	
5.0	Clay Till, tr gravel, olive, moist, hard				10	
6.0	Siltstone Bedrock, gray, dry, hard				10	
7.0	Siltstone Bedrock, gray, dry, hard				20	
8.0						
9.0						
10.0						
11.0						
12.0						

BASE PROPERTY CONSULTANTS LTD.

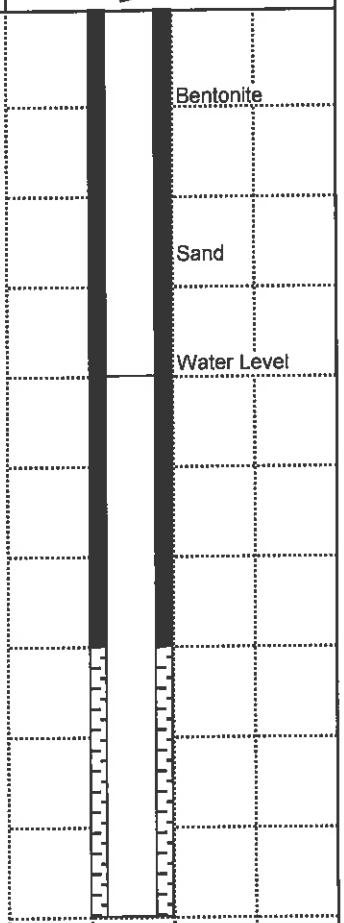
GROUNDWATER LEVEL: na | DATE: Aug 25, 2008

DATE DRILLED: Aug 25, 2008 | LOGGED BY: bc

PROJECT: Mountain View Meadows	**BOREHOLE NO. E3**
PROJECT NO.: ESA 872-2	**DRILL TYPE:** Auger
LOCATION: Olds, AB	**ELEVATION:** na
CLIENT: Brown & Associates	

SAMPLE TYPE: ■ SHELBY TUBE ▨ SPLIT SPOON ▩ DISTURBED

DEPTH (m)		SAMPLE TYPE	SAMPLE NO.	Lab Sample	VOC (PPM)
0.0	Grass				
1.0	Sand, tr gravel, lt olive, dry, compact				15
2.0	Sand, tr gravel, lt olive, dry, compact				30
3.0	Silt & Clay Till, tr gravel, med olive, moist, stiff				20
4.0	Silt & Clay Till, tr gravel, med olive, moist, stiff				25
5.0	Silt & Clay Till, tr gravel, dk olive-gray, moist, hard				35
6.0	Silt & Clay Till, tr gravel, dk olive-gray, moist, hard				10
7.0	Silt & Clay Till, tr sand, gray, moist, hard				45
8.0	Silt & Clay Till, tr sand, gray, moist, hard		E3-8	X	50
9.0	Silt & Clay Till, tr sand, gray, moist, hard				25
10.0	Silt & Clay Till, tr sand, gray, moist, hard				10
11.0					
12.0					



BASE PROPERTY CONSULTANTS LTD.

GROUNDWATER LEVEL: 4 m bgs | DATE: Aug 25, 2008

DATE DRILLED: Aug 25, 2008 | LOGGED BY: bc

PROJECT: Mountain View Meadows	**BOREHOLE NO. E9**
PROJECT NO.: ESA 872-2	**DRILL TYPE:** Auger
LOCATION: Olds, AB	**ELEVATION:** na
CLIENT: Brown & Associates	

SAMPLE TYPE: SHELBY TUBE | SPLIT SPOON | DISTURBED

DEPTH (m)		SAMPLE TYPE	SAMPLE NO.	Lab Sample	VOC (PPM)
0.0	Grass				
1.0	Silt, Clay & Sand Fill, olive, moist, firm				20
2.0	Silt, Clay & Sand Fill, olive, moist, firm				20
3.0	Silt, Clay & Sand Fill, olive, moist, firm				25
4.0	Silt, Clay & Sand Fill, olive, moist, firm				50
5.0	Clay Till, dk olive, moist, hard		E9-5	X	75
6.0	Clay Till, dk olive, moist, hard				15
7.0	Clay Till, dk olive, moist, hard				15
8.0					
9.0					
10.0					
11.0					
12.0					

Well Profile: Bentonite; Sand; Water Level

BASE PROPERTY CONSULTANTS LTD.

GROUNDWATER LEVEL: 4.2 m b | DATE: Aug 25, 2008

DATE DRILLED: Aug 25, 2008 | LOGGED BY: bc

Appendix C: Laboratory Results

ANALYTICAL REQUEST FORM

COC# 37601

Access Analytical Laboratories Inc.
#3, 2215 - 27 Avenue, N.E., Calgary, AB T2E 7M4
Phone (403) 291-4682 Fax (403) 291-4688
www.accesslabs.ca

Turnaround

Normal ☒ (5 Days)
Rush ☐ ☐ ☐ ☐
Days 1 2 3 4

Access W/O#
Project ESA 872-2
Legal

REPORTING INFORMATION

Consultant Base Property Consultants Ltd.
Contact Brian Chikmoroff
Address 45 Deer River Green SE
Calgary, AB. T2J 7A2
Phone (403) 680-6284 Cell
Fax (403) 278-9738
e-mail

Reporting Method
Mail X ☐
Fax X ☐
Email:
PDF ☐
Excel ☐
Flat ☐

INVOICING INFORMATION

Client Base Property Consultants Ltd.
Contact Brian Chikmoroff
Address 45 Deer River Green SE
Calgary, AB. T2J 7A2
Phone (403) 680-6284
Fax (403) 278-9738
e-mail

To Consultant
Report ☐
Report + Invoice X ☐
To Client
Report ☐
Report + Invoice ☐
Invoice Only ☐

Relinquished By Aug 25/08 B Chikmoroff
Date
Received By
Date

Relinquished By
Date
Received By
Date

Analysis Request

Access Lab #	Client Sample Description	Date / Time	Containers Jar	Bag	CCME PCS	VOC 624	TERM	Hol
1	E1 - 3		✓		✓			
2	E3 - 8		✓			✓	✓	
3	E9 - 5a		✓			✓	✓	
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Special Instructions

ANALYTICAL REQUEST FORM

COC# 3755

Access Analytical Laboratories Inc.
#3, 2215 - 27 Avenue, N.E., Calgary, AB T2E 7M4
Phone (403) 291-4682 Fax (403) 291-4688
www.accesslabs.ca

Turnaround
Normal [X] (5 Days)
Rush [ ] [ ] [ ] [ ]
Days 1 2 3 4

Access W/O#
Project ESA 872-2
Legal

REPORTING INFORMATION

Consultant Base Property Consultants Ltd.
Contact Brian Chikmoroff
Address 45 Deer River Green SE
Calgary, AB. T2J 7A2
Phone (403) 660-6284 **Cell**
Fax (403) 278-9738
e-mail

Reporting Method
Mail X [ ]
Fax X [ ]
Email:
PDF [ ]
Excel [ ]
Flat [ ]

Relinquished By [signature]
Date Oct 10 03
Received By
Date

Relinquished By
Date [illegible]
Received By [signature]
Date

INVOICING INFORMATION

Client Base Property Consultants Ltd.
Contact Brian Chikmoroff
Address 45 Deer River Green SE
Calgary, AB. T2J 7A2
Phone (403) 660-6284
Fax (403) 278-9738
e-mail

To Consultant
Report [ ]
Report + Invoice X [ ]
To Client
Report [ ]
Report + Invoice [ ]
Invoice Only [ ]

Access Lab #	Client Sample Description	Date / Time	Containers Jar	Bag	Analysis Request VOC's 624 MW	Hol
1	E3		✓		✓ ✓	
2						
3						
4						
5						
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7						
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10						
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13						
14						
15						

Special Instructions

Access Analytical Laboratories Inc.

#3, 2215 - 27 Avenue N.E., Calgary, AB T2E 7M4
Tel: (403) 291-4682 • Fax: (403) 291-4688
www.accesslabs.ca

Name: Base Property Consultants Ltd.	**Workorder:** 23630
Address: 45 Deer River Green S.E	**COC:** 37600
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Aug 26, 2008
Phone: (403) 660-6284	**Date Reported:** Sep 3, 2008
Fax: (403) 278-9738	**Samples:** 3 Soil

CCME Petroleum Hydrocarbons - Soil

Lab #:			**23630-01**
Date Sampled:			**26-Aug-08**
	Detection Limit	**Units**	**E1-8**
BTEX			
Extraction Date			26-Aug-08
Benzene	0.02	mg/kg dry wt.	< 0.02
Toluene	0.02	mg/kg dry wt.	< 0.02
Ethyl Benzene	0.02	mg/kg dry wt.	< 0.02
m,p-Xylene	0.02	mg/kg dry wt.	< 0.02
o-Xylene	0.02	mg/kg dry wt.	< 0.02
Total Xylenes (o,m, & p)	0.02	mg/kg dry wt.	< 0.02
CCME Petroleum Hydrocarbons			
Extraction Date			26-Aug-08
F1-BTX	0.1	mg/kg dry wt.	< 0.1
F2 (C10 - C16)	10	mg/kg dry wt.	< 10
F3 (C16 - C34)	10	mg/kg dry wt.	316
F4 (C34 - C50)	10	mg/kg dry wt.	164
F4-HTG (C34+)***	10	mg/kg dry wt.	222**
% Moisture	0.1	%	12.5

*Chromatogram did go to baseline (as per CCME guidelines) therefore report only the F4 (C34-C50) value.

**Chromatogram did not go to baseline

*** The F4 fraction to be reported can be either F4 (C34 - C50) or F4 $_{HTG}$ (C34+). Fraction F4$_{HTG}$ is a result derived from the use of high temperature gas chromatography as noted in the CCME Canada-Wide PHC Method and should be utilized if it is noted that the chromatogram **does not** go to baseline.

BTEX results, and PAHs (if requested), have been subtracted from the appropriate fractions.

Access Analytical Laboratories Inc.

Name:	Base Property Consultants Ltd.	**Workorder:**	**23630**
Address:	45 Deer River Green S.E	**COC:**	37600
		Project:	ESA 872-2
	Calgary	**Legal Desc:**	
	AB T2J 7A2		
Contact:	Brian Chikmoroff	**Date Received:**	Aug 26, 2008
Phone:	(403) 660-6284	**Date Reported:**	Sep 3, 2008
Fax:	(403) 278-9738	**Samples:**	3 Soil

EPA 624 Volatiles Screen - Soil

Lab #:			**23630-02**	**23630-03**
Date Sampled:			**26-Aug-08**	**26-Aug-08**
	Detection Limit	**Units**	**E3-8**	**E9-5a**
EPA 624				
Benzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
Bromodichloromethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Bromoform	0.02	mg/kg dry wt.	< 0.02	< 0.02
Bromomethane	0.1	mg/kg dry wt.	< 0.1	< 0.1
Carbon Tetrachloride	0.01	mg/kg dry wt.	< 0.01	< 0.01
Chlorobenzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
Chloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Chloroform	0.01	mg/kg dry wt.	< 0.01	< 0.01
Chloromethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Dibromochloromethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,2-Dichlorobenzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,3-Dichlorobenzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,4-Dichlorobenzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,1-Dichloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,2-Dichloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,1-Dichloroethene	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,2-Dichloroethene (cis)	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,2-Dichloroethene (trans)	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,2-Dichloropropane	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,3-Dichloropropene (cis)	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,3-Dichloropropene (trans)	0.02	mg/kg dry wt.	< 0.02	< 0.02
Ethyl Benzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
Methylene Chloride	0.1	mg/kg dry wt.	< 0.1	< 0.1
1,1,2,2-Tetrachloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Tetrachloroethene	0.02	mg/kg dry wt.	< 0.02	< 0.02
Toluene	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,1,1-Trichloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,1,2-Trichloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Trichloroethene	0.02	mg/kg dry wt.	< 0.02	< 0.02
Trichlorofluoromethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Vinyl Chloride	0.01	mg/kg dry wt.	< 0.01	< 0.01
Total Xylenes (o,m, & p)	0.02	mg/kg dry wt.	< 0.02	< 0.02
Surrogates				
1,2-Dichloroethane-d4		%	89	87
Toluene-d8		%	100	100
Bromofluorobenzene		%	103	105

Access Analytical Laboratories Inc.

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Address: 45 Deer River Green S.E	**COC:** 37600
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Aug 26, 2008
Phone: (403) 660-6284	**Date Reported:** Sep 3, 2008
Fax: (403) 278-9738	**Samples:** 3 Soil

Metals - Alberta Tier I - Soil

Lab #:			**23630-02**	**23630-03**
Date Sampled:			**26-Aug-08**	**26-Aug-08**
	Detection Limit	**Units**	**E3-8**	**E9-5a**
Metals Tier 1				
Antimony	0.4	mg/kg dry wt.	<0.4	<0.4
Arsenic	0.6	mg/kg dry wt.	5.1	5.6
Barium	0.5	mg/kg dry wt.	220	199
Beryllium	0.6	mg/kg dry wt.	<0.6	<0.6
Cadmium	0.1	mg/kg dry wt.	0.2	0.2
Chromium	0.4	mg/kg dry wt.	19.3	19.3
Cobalt	0.5	mg/kg dry wt.	7.3	7.2
Copper	0.2	mg/kg dry wt.	21.9	20.2
Lead	0.3	mg/kg dry wt.	12.6	12.0
Molybdenum	0.2	mg/kg dry wt.	0.4	<0.2
Nickel	0.6	mg/kg dry wt.	21.4	20.3
Selenium	0.5	mg/kg dry wt.	<0.5	<0.5
Silver	0.5	mg/kg dry wt.	<0.5	<0.5
Thallium	0.5	mg/kg dry wt.	<0.5	<0.5
Tin	0.6	mg/kg dry wt.	<0.6	<0.6
Vanadium	0.3	mg/kg dry wt.	18.8	19.5
Zinc	0.5	mg/kg dry wt.	66.4	60.9
Mercury				
Mercury	0.5	mg/kg dry wt.	< 0.5	< 0.5

Access Analytical Laboratories Inc.

Per: _____

Bob Corbet, M.Sc., P.Chem.
Manager, Technical Services

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd.	**Workorder:** 23630
Address: 45 Deer River Green S.E	**COC:** 37600
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Aug 26, 2008
Phone: (403) 660-6284	**Date Reported:** Sep 3, 2008
Fax: (403) 278-9738	**Samples:** 3 Soil

Soil and Water Quality Guidelines for Hydrocarbons at Upstream Oil and Gas Facilities (July, 2007)

Alberta Tier 1 Hydrocarbon Remediation Guidelines for Surface Soils

Land Use	Soil Type	Benzene	Toluene	Ethylbenzene	Xylenes	mg/kg F1	F2	F3	F4
Natural	Fine	0.046	0.52	0.11	15	210	150	1300	5600
	Coarse	0.078	0.49	0.21	28	210	150	300	2800
Agricultural	Fine	0.046	0.52	0.11	15	210	150	1300	5600
	Coarse	0.073	0.49	0.21	12	24	130	300	2800
Residential	Fine	0.046	0.52	0.11	15	210	150	1300	5600
	Coarse	0.073	0.49	0.21	12	24	130	300	2800
Commercial	Fine	0.046	0.52	0.11	15	320	260	2500	6600
	Coarse	0.078	0.49	0.21	28	270	260	1700	3300
Industrial	Fine	0.046	0.52	0.11	15	320	260	2500	6600
	Coarse	0.078	0.49	0.21	28	270	260	1700	3300

Alberta Tier 1 Hydrocarbon Remediation Guidelines for Sub-Soils(2007)*

Applicable below 1.5m depth within a 5 metre radius of wellhead (3 metres depth everywhere else)

Land Use	Soil Type	Benzene	Toluene	Ethylbenzene	Xylenes	mg/kg F1	F2	F3	F4
Natural	Fine	0.046	0.52	0.11	15	420	300	2600	10000
	Coarse	0.078	0.49	0.21	28	420	300	600	5600
Agricultural	Fine	0.046	0.52	0.11	15	420	300	2600	10000
	Coarse	0.078	0.49	0.21	16	30	160	600	5600
Residential	Fine	0.046	0.52	0.11	15	420	300	2600	10000
	Coarse	0.078	0.49	0.21	16	30	160	600	5600
Commercial	Fine	0.046	0.52	0.11	15	640	520	3500	10000
	Coarse	0.078	0.49	0.21	28	440	520	2500	6600
Industrial	Fine	0.046	0.52	0.11	15	640	520	3500	6600
	Coarse	0.078	0.49	0.21	28	440	520	2500	6600

*F1 to F4 = Petroleum Hydrocarbon Fractions as defined by CCME (2001)

***The Guidelines noted above are as per the July, 2007 revision and represent the most stringent criteria in each category (pathway). To see the entire Guide, please refer to Tier 1 Guidelines Alta. Environment (July, 2007)**

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd.	**Workorder:** 23630
Address: 45 Deer River Green S.E	**COC:** 37600
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Aug 26, 2008
Phone: (403) 660-6284	**Date Reported:** Sep 3, 2008
Fax: (403) 278-9738	**Samples:** 3 Soil

Quality Assurance Report

Method: CCME Response Factors
Date: 29-Aug-08
Analyst: Gavin January

Carbon Range	Amount Ng's	Area	RF	RT	% of Tol.
C6	100	30759	0.003251	3.83	104+/- 30%
C10	100	30689	0.003258	13.02	104+/- 30%
Toluene	100	31857	0.003139	7.49	100

Carbon Range	Response	
C10/C12	0.0716	
C16	0.0705	
C34	0.0712	
C50	0.0711	
Average RF C10, 16, 34	0.0711	
		Range %
Average RF C10, 26, 34 / RF C50	108.4%	70-110

Calibration Check Low Point	Actual Amt (ng)	Recovered Amt (ng)	% Recovery
Benzene	10.0	10.7	107%
Toluene	10.0	9.9	99%
Ethyl Benzene	10.0	9.4	94%
M+P Xylenes	10.0	9.5	95%
O-Xylene	10.0	9.5	95%

Calibration Check Mid Point	Actual Amt (ng)	Recovered Amt (ng)	% Recovery
Benzene	100	90	90%
Toluene	100	97	97%
Ethyl Benzene	100	89	89%
M+P Xylenes	100	88	88%
O-Xylene	100	93	93%

Estimates of uncertainty can be provided upon request.
Data for quality control samples is available on request.

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd.	**Workorder:** 23630
Address: 45 Deer River Green S.E	**COC:** 37600
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Aug 26, 2008
Phone: (403) 660-6284	**Date Reported:** Sep 3, 2008
Fax: (403) 278-9738	**Samples:** 3 Soil

Quality Assurance Report

Method: Metals in Soil
Date: 02-Sep-08
Analyst: Sandra Hirsche

Analyte	EnviroMat 1	EnviroMat 2	Advisory Range	Units
Antimony	0.24	0.22	0.18-0.28	ppm
Arsenic	0.33	0.32	0.28-0.37	ppm
Barium	0.50	0.50	0.38-0.59	ppm
Beryllium	0.21	0.21	0.16-0.25	ppm
Cadmium	0.12	0.12	0.09-0.15	ppm
Chromium	0.18	0.18	0.15-0.21	ppm
Cobalt	0.27	0.28	0.23-0.33	ppm
Copper	0.34	0.33	0.26-0.42	ppm
Lead	0.28	0.28	0.22-0.34	ppm
Molybdenum	0.32	0.31	0.24-0.40	ppm
Nickel	0.33	0.33	0.28-0.40	ppm
Selenium	0.08	0.06	0.046-0.072	ppm
Thallium	0.20	0.18	0.14-0.21	ppm
Vanadium	0.37	0.36	0.30-0.43	ppm
Zinc	0.41	0.42	0.30-0.51	ppm

Method: Hg in Soil
Date: 02-Sep-08
Analyst: Rahul Surywanshi

Analyte	CRM020 1	CRM020 2	Advisory Range	Units
Mercury	0.77	0.81	0.59-0.85	ppm

Estimates of uncertainty can be provided upon request

Access Analytical Laboratories Inc.

Name:	Base Property Consultants Ltd.	**Workorder:**	**23630**
Address:	45 Deer River Green S.E	**COC:**	37600
		Project:	ESA 872-2
	Calgary	**Legal Desc:**	
	AB T2J 7A2		
Contact:	Brian Chikmoroff	**Date Received:**	Aug 26, 2008
Phone:	(403) 660-6284	**Date Reported:**	Sep 3, 2008
Fax:	(403) 278-9738	**Samples:**	3 Soil

Method References

BTEX

Preparation based on EPA 5035; Analysis based on "Volatile Organic Contaminants by GC/MS", EPA 8240/8260.

Mercury (Cold Vapour)

Based on U.S. EPA Method 7473 by Thermal Decompostition followed by Atomic Absorption Spectrophotometry.

Metals Prep in Soil / Solid

Based on EPA Method 3050B. Acid Digestion of Sediments, Sludges and Soils.

Metals Tier 1: EPA 3050 Digest

Based on U.S. EPA Method 3050 digestion with analysis by ICP-AES (EPA Method 6010B).

*Results relate only to the items tested.
*Parameters reported in italics designates non-accreditation.

Access Analytical Laboratories Inc.

#3, 2215 - 27 Avenue N.E., Calgary, AB T2E 7M4
Tel: (403) 291-4682 - Fax: (403) 291-4688
www.accesslabs.ca

Name: Base Property Consultants Ltd.	**Workorder:** 24270
Address: 45 Deer River Green S.E	**COC:** 37555
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Oct 10, 2008
Phone: (403) 660-6284	**Date Reported:** Oct 20, 2008
Fax: (403) 278-9738	**Samples:** 1 Water

EPA 624 Volatile Screen - Water

Lab #:			24270-01
Date Sampled:			10-Oct-08
	Detection Limit	**Units**	**E3**
EPA 624			
Benzene	0.001	mg/L	< 0.001
Bromodichloromethane	0.001	mg/L	< 0.001
Bromoform	0.001	mg/L	< 0.001
Bromomethane	0.005	mg/L	< 0.005
Carbon Tetrachloride	0.0005	mg/L	< 0.0005
Chlorobenzene	0.001	mg/L	< 0.001
Chloroethane	0.001	mg/L	< 0.001
Chloroform	0.0005	mg/L	< 0.0005
Chloromethane	0.001	mg/L	< 0.001
Dibromochloromethane	0.001	mg/L	< 0.001
1,2-Dichlorobenzene	0.001	mg/L	< 0.001
1,3-Dichlorobenzene	0.001	mg/L	< 0.001
1,4-Dichlorobenzene	0.001	mg/L	< 0.001
1,1-Dichloroethane	0.001	mg/L	< 0.001
1,2-Dichloroethane	0.001	mg/L	< 0.001
1,1-Dichloroethene	0.001	mg/L	< 0.001
1,2-Dichloroethene (cis)	0.001	mg/L	< 0.001
1,2-Dichloroethene (trans)	0.001	mg/L	< 0.001
1,2-Dichloropropane	0.001	mg/L	< 0.001
1,3-Dichloropropene (cis)	0.001	mg/L	< 0.001
1,3-Dichloropropene (trans)	0.001	mg/L	< 0.001
Ethyl Benzene	0.001	mg/L	< 0.001
Methylene Chloride	0.005	mg/L	< 0.005
1,1,2,2-Tetrachloroethane	0.001	mg/L	< 0.001
Tetrachloroethene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
1,1,1-Trichloroethane	0.001	mg/L	< 0.001
1,1,2-Trichloroethane	0.001	mg/L	< 0.001
Trichloroethene	0.001	mg/L	< 0.001
Trichlorofluoromethane	0.001	mg/L	< 0.001
Vinyl Chloride	0.0005	mg/L	< 0.0005
Total Xylenes (o,m, & p)	0.001	mg/L	< 0.001

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd.	**Workorder:** 24270
Address: 45 Deer River Green S.E	**COC:** 37555
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Oct 10, 2008
Phone: (403) 660-6284	**Date Reported:** Oct 20, 2008
Fax: (403) 278-9738	**Samples:** 1 Water

Quality Assurance Report

Method: BTEX
Date: 17-Oct-08
Analyst: Ron Towler

Calibration Check

Analyte	Amount Expected	Amount Found	Recovery	Units
Benzene	200	181	91%	ng
Toluene	200	188	94%	ng
Ethyl Benzene	200	204	102%	ng
M+P Xylenes	400	413	103%	ng
O-Xylene	200	209	105%	ng
Trichloroethene	200	184	92%	ng
Tetrachloroethene	200	190	95%	ng
Naphthalene	200	225	113%	ng

	Matrix Spike - Sample #1			Matrix Spike - Sample #2		
Analyte	Amount Expected	Amount Found	Recovery	Amount Expected	Amount Found	Recovery
Benzene	39.9	41.4	103.8%	39.9	40.2	100.8%
Toluene	18.0	20.2	112.2%	18.0	20.7	114.9%
Ethyl-Benzene	197.3	203.1	102.9%	197.3	195.2	98.9%
M+P Xylenes	176.6	196.9	111.5%	176.6	182.4	103.3%
O-Xylene	13.8	13.6	98.3%	13.8	15.1	109.1%
			105.7%			105.4%
			% Accuracy	105.6		
			%RSD	0.305		

Duplicates	Sample #1 09-Oct-08	Sample #2 09-Oct-08	% Difference
Benzene	0.000	0.000	0.00
Toluene	0.000	0.000	0.00
Ethyl-Benzene	0.000	0.000	0.00
M+P Xylenes	0.000	0.000	0.00
O-Xylene	0.000	0.000	0.00

Estimates of uncertainty can be provided upon request

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd. **Address:** 45 Deer River Green S.E Calgary AB T2J 7A2 **Contact:** Brian Chikmoroff **Phone:** (403) 660-6284 **Fax:** (403) 278-9738	**Workorder:** 24270 **COC:** 37555 **Project:** ESA B72-2 **Legal Desc:** **Date Received:** Oct 10, 2008 **Date Reported:** Oct 20, 2008 **Samples:** 1 Water

Quality Assurance Report

Method: Metals in Water
Date: 16-Oct-08
Analyst: Sandra Hirsche

Analyte	EnviroMat 1	EnviroMat 2	Advisory Range	Units
Aluminum	0.86	0.83	0.717-0.989	ppm
Antimony	0.24	0.24	0.162-0.277	ppm
Arsenic	0.18	0.18	0.146-0.214	ppm
Barium	0.52	0.52	0.470-0.569	ppm
Beryllium	0.09	0.09	0.077-0.103	ppm
Boron	0.60	0.61	0.494-0.766	ppm
Cadmium	0.11	0.11	0.093-0.127	ppm
Cobalt	0.34	0.34	0.288-0.373	ppm
Chromium	0.90	0.91	0.726-1.03	ppm
Copper	0.59	0.61	0.552-0.650	ppm
Iron	0.74	0.70	0.624-0.813	ppm
Lead	0.82	0.84	0.888-0.926	ppm
Molybdenum	0.58	0.59	0.473-0.666	ppm
Nickel	0.90	0.91	0.788-0.968	ppm
Selenium	0.06	0.06	0.032-0.088	ppm
Strontium	0.67	0.73	0.576-0.78	ppm
Vanadium	0.91	0.92	0.798-1.01	ppm
Zinc	0.46	0.44	0.387-0.494	ppm

Estimates of uncertainty can be provided upon request

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd. **Address:** 45 Deer River Green S.E Calgary AB T2J 7A2 **Contact:** Brian Chikmoroff **Phone:** (403) 660-6284 **Fax:** (403) 278-9738	**Workorder:** 24270 **COC:** 37555 **Project:** ESA 872-2 **Legal Desc:** **Date Received:** Oct 10, 2008 **Date Reported:** Oct 20, 2008 **Samples:** 1 Water

Method References

Metals in Water (ICP-AES)

U.S. EPA 600/4-79-620, Method no. 200.7 9ICP-AES)

Metals in Water (ICP-MS)

U.S. EPA 600/4-79-620, Method no. 200.7 9ICP-MS). Passed proficiency testing and are awaiting notice of final accreditation.

*Results relate only to the items tested.
*Parameters reported in italics designates non-accreditation.

Appendix D – Curriculum Vitae

Brian M. Chikmoroff, P. Eng.

Education

B. Sc. (Civil Engineering) 1985, University of Calgary
B. Sc. (Environmental Biology) 1979, University of Calgary

Expertise

Mr. Chikmoroff has over twenty years expertise in the planning, design, construction and marketing of land for development, management of a land bank in excess of 4000 acres plus hands-on field experience in the environmental areas of water quality sampling, soils sampling and the freeze/thaw modeling of soils.

Mr. Chikmoroff is experienced in environmental site assessments of commercial sites, raw land and residential property, conducting over 700 hundred Phase One, Two and Three Assessments on lands that had undergone varied uses since the late 1800's. He has directed soil investigations for purposes ranging from the search for environmental contaminants through to structural investigations and has participated in water sampling programs searching for and measuring contaminants. On the research side, he has studied the use of biological monitors as a means to track the presence of pollutants in aquatic environments.

Land development experience included the management of over 4000 acres of raw land in the Calgary region. Mr. Chikmoroff has been responsible for the costing, construction, pricing and marketing of residential properties ranging from entry level through to estate properties at a volume of between two to three hundred lots per year. As a part of this development process he has coordinated planning and engineering consultants to obtain provincial and municipal approvals ranging from area structure, outline and tentative plans through to subdivision and permission to construct.

In technical expertise, Mr. Chikmoroff has designed single and multi family subdivisions as well as site services for commercial developments. He has coordinated all aspects of municipal construction projects from site grading through to paving and landscaping. Mr. Chikmoroff has been responsible for materials testing on municipal construction projects.

Experience

1994 to Present	**Base Property Consultants Ltd.** President and Senior Environmental Consultant Responsible for Phase One, Two and Three environmental site assessments (ESA's) and environmental property audits (EPA's).
1987 - 1994	**Genstar Development Co.** Development Manager/Project Manager Responsible for the management of land bank, development, construction and marketing of residential properties.
1986 to 1987	**Kellam Berg Engineering and Surveys** Municipal Design Engineer Responsible for the deep service, roadway and sidewalk design of residential and commercial developments.
1984 to 1985	**Markborough Properties Inc.** Field Coordinator Responsible for the management of new and maintenance construction of residential subdivisions.
1979 to 1981	**EBA Engineering Consultants Ltd.** Materials Technician/ Engineering Assistant Responsible for geotechnical investigations, materials testing and analytical analysis of data from a geothermal computer model.

Professional Affiliations

Member, Alberta Professional Engineers, Geologists and Geophysicists Association
Past Member, City of Calgary Environmental Advisory Committee
Past Chairman, Environmental Committee, Urban Development Institute, Calgary Chapter

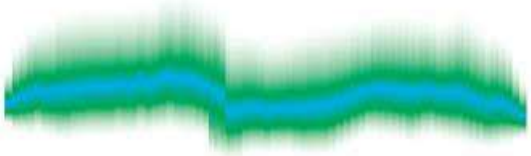
Presentations

"Residential Land Development and Calgary's New Environmental Policy" (1993)
Conference on Sustainable Development - Faculty of Environmental Design

APPENDIX F5

Athena –

Phase 1 ESA



Bifröst

Environmental and Remediation Services Inc.

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Netook Development Area

Portion of NW 2-33-1 W5M

Mountain View County, Alberta

Prepared For:

Greg Brown, MBA, BES, RPP, MCIP

Advisor / Planner

B&A Planning Group

600 215 9th Avenue SW

Calgary, Alberta, T2P 1K3

Prepared By:

Athena Environmental Consultants Ltd.

364 Spruce Street

Springbrook, AB

T4S 0P1

Athena Project #21-0018

November 15, 2021

Greg Brown, MBA, BES, RPP, MCIP
Advisor / Planner
B&A Planning Group
600 215 9th Avenue SW
Calgary, Alberta, T2P 1K3
gbrown@bapg.ca

November 15, 2021

Dear Mr. Brown:

Re: Phase I Environmental Site Assessment
Netook Development Area, Mountain View County, Alberta
Portion of NW 2-33-1 W5M

We are pleased to submit our report describing the findings of our Phase I Environmental Site Assessment for the subject property.

If you have any questions or require further clarification of the report findings, please contact the undersigned at your convenience. Thank you for the opportunity to be of service.

Sincerely,

Wendy E R Thorne

Wendy E.R. Thorne, B.A.Sc., M.E.Des., P.Eng.
Principal
Athena Environmental Consultants Ltd.
T: 403-246-1986
C: 403-620-3736
E: wthorne@athenaenv.ca

EXECUTIVE SUMMARY

A Phase I Environmental Site Assessment was conducted for 50.75 ha cultivated land located at NW 2-33-1 W5M in Mountain View County, Alberta. The purpose of the Phase I Environmental Site Assessment was to determine, on the balance of probabilities, whether there was likely to be significant environmental liability associated with this property. Environmental assessment of this property was required to support development of the subject property.

The subject property has been consistently used for agricultural purposes. There are two natural gas pipelines along the east property boundary but these are of low concern. Hazardous building materials are not of concern since no buildings were present on the subject property.

The only activity within 300 m of the subject property that could have the potential for contaminant migration onto the subject property was the well site located at 14-2-33-1 W5M, adjacent to the subject property. The well was a sweet gas well drilled in 2004 and abandoned in 2018. This well appears to be in the process of reclamation, as no reclamation certificate was on file. In light of the regulatory requirements in place during the period in which this well was operated and abandoned, it seems reasonable to assume that the likelihood that potential contaminants of concern affecting the subject property is relatively low.

In summary, there was no evidence of significant environmental liabilities associated with the subject property. The need for more invasive Phase II Environmental Site Assessment does not appear warranted, nor is any recommended, at this time.

Any groundwater source wells found on the subject property should be decommissioned by a certified driller. Groundwater wells are a potential pathway for migration of contamination into the subsurface and may pose a safety hazard.

In the very unlikely event that any buried foreign materials, stained or noxious smelling soils are encountered during site development, a qualified environmental consultant should be contacted to determine whether there is a significant environmental concern associated with these materials, and the proper means of disposal. In the very unlikely event that drilling fluids are encountered, the Alberta Energy Regulator should be contacted and informed, so this can be resolved during the wellsite reclamation certification process.

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1.0 INTRODUCTION

1.1 Purpose and Scope

Athena Environmental Consultants Ltd. was retained by Greg Brown, Advisor / Planner, B&A Planning Group, through signed acceptance received by email on June 24, 2021 of a proposal dated May 15, 2021. The purpose of this project was to conduct a Phase I Environmental Site Assessment (ESA) for a property located in Mountain View County, Alberta. The property consisted of 50.75 ha of cultivated land. The property location was east of the Town of Olds, one quarter section north of the intersection of Highway 27 and Range Road 12, one the east side of Range Road 12. The legal description of the property was NW 2-33-1 W5M. The west portion of NW 2, consisting of Plan 9910326 Block 1, and Plan 9911244 Blocks 2 to 11, is not included in this assessment. Environmental assessment of this property was required to required to support development of the subject property.

The purpose of Phase I Environmental Site Assessment is to collect readily available current and historical information in order to determine, on the balance of probabilities, whether there are likely to be significant environmental liabilities associated with a particular property, particularly in the form of contamination.

1.2 Background

Base Property Consultants Ltd conducted a Phase I ESA of W 1/2 2-33-1 W5M which included the subject property, as well as SE 2-33-1 W5M and SE 3-33-1 W5M, in April 2008. A portion of the west side of NW 2 had been subdivided into residential acreages, and was outside the study area. A sweet natural gas pipeline crossing the northeast corner of NW 2 (the current subject property) was identified. An oil and gas battery adjacent to the east-central portion of NW 2 was also identified.

Outside the current subject property, was a wellsite located within SE 3-33-1 W5M. There was a former gas station located in SE 2-33-1 W5M; we note that this was over 300 m from the current subject property. SW 2-33-1 W5M also had an above-ground fuel tank present. This tank was on a farmstead which was well over 300 m from the current subject property. A Phase II ESA was recommended for both SE 2 -33-1 W5M and SE 3-33-1 W5M.

A follow-up Phase II ESA of two selected locations within SE 2 and SE 3 33-1 W5M was completed by Base Property Consultants Ltd. in October 2008. The locations included an abandoned wellsite within SE 3-33-1W5M, and a service station adjacent to SE 2-33-1W5M. A total of 37 boreholes were advanced, four of which were completed as groundwater monitoring wells. Three soil and one

groundwater sample were submitted for laboratory analysis. There were no exceedances of the prevailing guidelines for metals in the two soil and groundwater samples, except for manganese in the groundwater sample, which is typically naturally elevated in southern Alberta. In the one soil sample submitted for hydrocarbon analyses there were no exceedances of the prevailing guidelines. There were no detectable VOCs in the two samples submitted for analysis. The report concluded there was no significant impact to these sites.

2.0 METHODOLOGY

This Phase I Environmental Site Assessment (ESA) included the collection and interpretation of current and historical information which was readily available within a reasonable time frame, and relevant to the potential for building or site contamination. This assessment was generally conducted to meet the requirements of the following:

- Alberta Environment and Parks *Alberta Environmental Site Assessment Standard* (2016),
- Canadian Standards Association *Phase I Environmental Site Assessment Standard Z768-01* (most current version; reaffirmed 2006),
- CMHC *Environmental Assessment Guidelines for Residential Development* (1995), and

These requirements were interpreted or modified according to professional judgment based on previous experience and current environmental assessment practice standards, as specified within each set of requirements.

The first stage of the Phase I ESA was a search of available records for information pertaining to the site. These included but were not limited to the following:

- Historical property titles;
- Historical aerial photographs;
- Underground and above ground fuel and lubrication oil storage tank records;
- Current and historical site and building plans, where available; and
- Operator and/or company environmental records, including but not limited to permits, waste management methods or disposal manifests, spill or emissions reports, chemical inventories, monitoring data, and previous consulting reports.

Records searches for information pertaining to the site and surrounding area included but were not limited to:

- Municipal databases, directories, and land use plans relating to current and historical land use of the site and surrounding area;
- Fire insurance maps, where coverage is available;
- Provincial databases relating to site physiography, regulatory approvals and compliance, and specific types of land uses associated with the potential for contamination; and
- Publicly available environmental reports and correspondence for the site and surrounding area.

Records search distances were determined based on:

- potential for site contamination, given the general current and historical land use of the subject property and surrounding area;
- the maximum likely migration distance of any suspected sources of contamination;
- planned or likely future uses of the subject property;
- availability of information; and
- the requirements of the Alberta Environment and Parks 2016 *Site Assessment Standard.*

The second stage of the Phase I ESA was a site inspection and follow-up telephone interview. The purpose of this inspection was to observe current site conditions and activities, and activities being conducted on surrounding properties with the potential for significant environmental impacts. The site inspection was conducted by Athena Environmental Consultants Ltd. staff; additional information was provided by Greg Brown.

3.0 RESULTS

3.1 Interpretation of Historical Aerial Photographs

Historical aerial photographs were obtained and reviewed; preferably at five-year intervals or as available, and back to a date prior to when development first appeared in the area of the subject property. Priority was given to selecting photographs taken at a smaller scale. The historical aerial photographs were obtained through Alberta Environment and Parks. Relatively current photos were also obtained from Google Earth. Aerial photographs were listed and interpreted in Table 1. Due to copyright restrictions, they have not been reproduced.

The subject property has been agricultural in use since at least the 1940s. The surrounding area has also been predominantly agricultural, with the exception of rural residences along the west boundary of the quarter section, and the golf course to the west. A wellsite was observed adjacent to the east of the subject property. There is some commercial development to the southeast of the subject property, at the intersection of Highway 27 and Highway 2.

Table 1. Interpretation of Historical Aerial Photographs

Date	Original Scale	Observations
2021	n/a	The subject property is under cultivation. The central portion of the property is treed with what appears to be a ponded area. There are also trees along the east property boundary. The adjacent sites to the north, east, and south are under cultivation. There are rural residences along the west boundary of the quarter section that contains the subject property. The quarter section west of NW 2 contains a golf course. There is some commercial development one quarter section south and one quarter section east of the subject property, at the intersection of Highway 27 and Highway 2.
2015	1:15,000	No significant changes were noted from the 2021 photo. The well site to the east of the subject property appears as a ponded area.
2011	n/a	No significant changes were noted from the 2015 photo

Table 1. Interpretation of Historical Aerial Photographs		
Date	Original Scale	Observations
2009	n/a	The well pad visible in the 2005 photo contains a production building; most of the pad is vegetated and the lease access road is barely visible.
2005	1:40,000	A well pad with berms and lease access road can be seen adjacent to the east of the approximate centre of NW 2.
2003	n/a	Rural residences along the west side of the quarter section that contains the subject property (NW 2) are in the process of being developed.
1998	1:30,000	The subject property is agricultural in use. There is a farmstead present in the southwest corner of the quarter section.
1991	1:20,000	The subject property is agricultural in use. There is a farmstead present in the southwest corner of the quarter section.
1985	1:25,000	The subject property is agricultural in use. There is a farmstead present in the southwest corner of the quarter section. Construction of the golf course to the west of the subject property appears to be complete.
1980	1:30,000	The subject property is agricultural in use. There is a farmstead present in the southwest corner of the quarter section. A golf course is under construction to the west of the subject property.
1975	1:24,000	The subject property is agricultural in use. There is a farmstead present in the southwest corner of the quarter section.
1969	1:24,000	The subject property is agricultural in use. There is a farmstead present in the southwest corner of the quarter section.
1963	1:31,680	The subject property is agricultural in use. There is a farmstead present in the southwest corner of the quarter section.
1949	1:40,000	The subject property is agricultural in use. There is a farmstead present in the southwest corner of the quarter section.

3.2 Results of Historical Titles Search

Historical land titles for the subject property were obtained through Alberta Registries. A search was requested to patent, based on the results of the historical aerial photograph review. The titles were

reviewed for information of environmental significance. This included but was not limited to the occupations or business interests of previous owners, utility right-of-ways, easements, restrictive covenants, oil and gas leases, and landfills. A summary of the results of the historical land title review is provided in Table 2.

The subject property has generally been owned by farmers since patent. In 2008 it was transferred to a private individual and two companies. This was the first time it was not owned solely by private individuals.

Table 2 - Summary of Historical Land Titles

Date	Title Number	Description	Landowner	Additional Information	Particulars
06/02/2008	081 049 654	Portions of NW 2-33-1 W5M	Abe Neufeld And 1273927 Alberta Ltd And 404048 Alberta Ltd		Caveat: Financial Development Agreements With Mountain View County Utility Right Of Way In Favour Of Foothills Natural Gas Co-Op Ltd
26/01/2001	011 026 121 +6	Portions of NW 2-33-1 W5M	Wilfred Mooney Burton	Farmer	
20/04/1999	991 103 986 +4	Portions of NW 2-33-1 W5M	Wilfred Mooney Burton	Farmer	
27/01/1999	991 024 133 +1	Portions of NW 2-33-1 W5M	Wilfred Mooney Burton	Farmer	
13/02/1969	155R156	Portions of NW 2-33-1 W5M	Wilfred Mooney Burton	Farmer	
Nov 8, 1961	124 R 65	NW 2-33-1 W5M	Henry Mellendorf	Farmer	Caveat: Financial
April 25, 1960	118 R 140	NW 2-33-1 W5M	Stefan Kupyna	Farmer	
Mar 27, 1957	106 O 58	NW 2-33-1 W5M	Oliver Louis Moritz And Kathryn Alice Moritz	Farmer	
Mar 27, 1957	106 O 56	NW 2-33-1 W5M	Oliver Louis Moritz And Kathryn Alice Moritz	Farmer	
Feb 13, 1948	78 N 10	NW 2-33-1 W5M	Edwin L. Bentz and Kathryn	Farmer	

Table 2 - Summary of Historical Land Titles					
Date	Title Number	Description	Landowner	Additional Information	Particulars
			Alice Bentz and Marvin Lester Bentz		
Feb 13, 1948	78 N 6	NW 2-33-1 W5M	Edwin L. Bentz and Kathryn Alice Bentz	Farmer	

3.3 ESAR Search

The Alberta Environment and Parks Environmental Site Assessment Repository (ESAR) database contains records of Phase I and Phase II Environmental Site Assessments, Site Remediation and Reclamation, and Risk Management Plans which have been submitted to the provincial regulatory authority where required, or in support of a development application. The database also contains inter-government correspondence relating to sites that have been identified as contaminated. The database came into operation in April, 2009 and contains all electronic records related to the above mentioned actives that are available for routine disclosure. There was one set of records were indicated on the ESAR database within a 300 m search radius (as specified in the Alberta Environment Tier 1 Guidelines) of the subject property. Upon review of the records it was found that the site was actually at a distance greater than 300 m from the subject property.

3.4 Municipal Records Search

A file search was requested through Mountain View County. Results were completed on August 10, 2021 and received by email from Vicki Lodermeier, Administrative Assistant, Legislative, Community & Agricultural Services Dept.

There was a drainage complaint on file for NW 2-33-1- W5M related to overland drainage. The report concluded that the issue was a civile matter. Most of this was redacted.

The Netook Crossing North Concept Plan was also included but did not include any information of environmental concern. The Base Property Phase I and Phase II ESA reports summarized in Section 1.2 of this report were also included. A BIA report was completed by Sweetgrass Consultants Ltd. in Sept 2008.

3.5 Zoning and site Development

According to the Mountain View County Land Use Map, accessed online, the subject property was zoned as Agricultural District (A). Permitted land uses and building requirements were provided in Section 11.1 6 of the Mountain View County Land Use Bylaw No. 16/18. The purpose of Agricultural Districts is “accommodate and promote agriculture land uses on larger parcels while having regard for the rural, agricultural character of the area.”

3.6 Storage Tanks

A search request for information regarding active or abandoned petroleum storage tanks associated with the subject property was submitted to the Alberta Safety Codes Council (ASCA). This database includes only information reported through registration or a survey of abandoned sites completed in 1992 and should not be considered as comprehensive. According to ASCA records, there were no underground or aboveground fuel storage tanks registered at the subject property.

3.7 Alberta Environment Authorization Viewer

The Alberta Environment Authorization Viewer is an online database of documents related to approvals, licenses, registrations, authorizations, permits and certificates issued under the *Water Act* and *Environmental Protection and Enhancement Act*

There was 1 active approval and 1 inactive approval registered on the Alberta Environment Approvals database for 2-33-1-W15M. The active approval was held by Blair Burto under the Water Act and does not expire. No additional information about the approval was available on the database. The inactive approval was held by Vero Energy Inc. under the Water Act. The approval was for rig water supply for a well in 14-2-33-1 W5M. A search was also conducted for NE 3-33-1 W5M which contained a Golf Course. There were 2 active and 7 inactive approvals held by Olds Golf Club Association which were for diversion of water for the golf course.

3.8 Alberta Environment Compliance/Enforcement Database

A search was made of the Alberta Environment Compliance / Enforcement database by the legal Plan number which includes the subject property, as well as the company name of the current owner. This database includes information on Alberta Environment compliance and enforcement activities since January 1, 2008.

All three sections of the database were searched:

1. Warning letters, tickets, and administrative penalties.

2. Enforcement Orders / Environmental Protection Orders / Water Management Orders since January 1, 2009
3. Prosecutions under AEPEA and the Water Act.

No compliance or enforcement activities relating to the subject property were found.

3.9 Alberta Environment Landfill Inventory

A search was conducted of a landfill inventory conducted on behalf of Alberta Environment and Environment Canada in 1982, contained in the report "Identification and Verification of Active and Inactive land Disposal Sites in the Province of Alberta" (MacLaren Plansearch Lavalin, 1982). The inventory included both active and inactive land disposal sites. The inventory identified 1152 landfill disposal sites, of which 705 were active, and 447 were inactive. Data pertaining to the relative risk of each site was also collected and reported.

The landfill inventory was searched for sites within ATS locations 2 and 3 33-1 W5M. No sites were found within these locations.

3.10 Help End Landfill Pollution (HELP) Data Tracking and Management Control System

The Help End Landfill Pollution (HELP) program was conducted on behalf of Alberta Environment from 1986 to 1988, to inventory, assess, and conduct risk management at industrial sites throughout Alberta likely to pose a significant threat to human or environmental health. The Data Tracking and Management Control System contains a list of the sites identified during the HELP program (termed "industrial landfills") with a summary of their status as of June, 1988. There is no public record of any updates having been released.

The HELP list was searched for sites within 300 m of the subject property. No sites were found.

3.11 National Pollutant Release Inventory

The National Pollutant Release Inventory is a database that consists of a record of pollutant releases maintained by Environment Canada. This database was accessed online to identify the pollutant releases within a 300 m radius of the subject property. They database does not allow for searches to be conducted by NTS, ATS, or legal description, but does contain the postal code for each facility listed in the database. To limit search results to those most likely to be within 300 m of the subject property, the postal code that covers the subject property was used. The results found a total of 171 facilities for the 2017 reporting year within the T0M postal code which included the subject property.

However, based on site coordinates provided in the database, none of the sites were within a 300 m radius of the subject property.

3.12 Site Physiography

The physiography section of this report, provided below, is a general desktop overview of site physiography, based directly on information from government reports and databases. This section is meant only for the purpose of this report. The databases used for this overview are not always up to date, may not have been ground truthed, or validated to the scale of the subject property. Where this section may have regulatory or financial implications, a qualified professional should be consulted to validate this information specifically for the subject property.

3.12.1. Surface Water

From a review of Google Earth and the Alberta Environment "Water Well Information Database" it was found that the nearest permanent water body was an unnamed ponded area located approximately on the subject property.

3.12.2. Flood Hazards

The Alberta Environment "Flood Hazard Identification Program" database, accessed online, showed the subject property as not being within a flood study area. The nearest flood study area was approximately 40 km to the west. It should be noted that this was not intended to be a detailed review of flood hazards for the subject property.

3.12.3. Soils

Soils information was obtained from the Alberta Agriculture "Alberta Soil Information Viewer" map-based database. Soils in the area of the subject property were identified as Antler and Didsbury soil types. These were well drained medium textured loamy soils. They were classed as Orthic black chernozems, which have darker and thicker topsoil (A horizon), and tend to support a mix of grass, forbs, and trees. (NRC Canada, 1998.)

3.12.4. Surficial Geology

A surficial geology map of the area of the subject property was accessed online (Shetsen, 1983). The surficial geology was mapped as being stagnation moraine and draper moraine. Draper moraine is defined as up to 5 m of till that contains minor amounts of water sorted material. Bedrock may be exposed in some areas. Stagnation moraine is till of uneven thickness that is water sorted in some areas and can be up to 30 m thick.

3.12.5. Groundwater Source Wells

An online search was conducted of the Alberta Environment "Water Well Information Database". A total of 24 groundwater source wells were shown on the database within 400 m of the subject property, or with the potential to be located within 400 m of the subject property. The wells were registered for domestic, stock, other, and unknown use. Well depths generally ranged from 17 m to 195 m. Well lithologies were generally logged as till with rock and boulders, that transitioned to interbedded sandstone and shale. The static water level was recorded to range from 2.32 m to 40.54 m.

3.12.6. Wetlands

The Alberta Merged Wetland Inventory, maintained by Alberta Environment, was accessed online to identify potential wetlands located within 400 m of the subject property. Wetlands are rated by Alberta Environment based on the following five criteria: biodiversity, water quality improvement, flood reduction, human uses, and abundance (Alberta Environment, 2014). The Alberta Wetland Policy assigns a relative wetland value, such as A, B, C, or D, where A denotes the highest value for the wetland to D being the lowest value.

There were an estimated 14 hectares of wetlands found within NW 2-33-1-W5M. A total of 6 hectares were assigned a C value and 7 hectares were assigned D value. They were classed as marsh type of wetland. Some of these wetlands appeared to be located on the subject property

It should be noted that the inventory is an approximation only and must be verified by a qualified wetlands practitioner.

3.13 Alberta Energy Regulator

The Alberta Energy Regulator (AER), formerly Energy Resources Conservation Board (ERCB), "OneStop Public Map Viewer" database was searched in the area of the subject property for complaints and releases relating to oil and gas activity, and also for well and pipeline locations. Search results are summarized in Table 3 below.

Table 3. AER Record Search

Record	Result
Complaints	None
Releases	None
Pipeline Locations	P47837-1 was licensed to Whitecap Resources Inc. and carried natural gas.

	P22854- 24 was licensed Foothills Natural Gas Co-op Ltd. and carried natural gas.
Well Identifiers	Well License 0308847 was licensed for White Cap Resources. See below for more information.
Facility Identifiers	None

The AER Abandoned Well Viewer database, available online, was searched. The database contains all abandoned wellsites in the province of Alberta. An abandoned well record was found with the potential to be located within 300 m of the subject property. The well was licensed to Whitecap Resources Inc. and was listed as abandoned. The license number was 0308847, and it was located in 14-02-033-01W5. The well was drilled in 2004, was suspended in September 2006, and then abandoned in November 2018.

3.14 Site Inspection

A site inspection was conducted on July 16, 2021, by Athena Environmental Consultants Ltd. staff. The weather was clear and dry with a temperature high of 26ºC. The ground surface of the subject property was dry with a canola crop that was about 1.2 m tall. There were no buildings on the subject property. Site access was from Range Road 12. All areas of the subject property were available for inspection, however the height of the crop impeded access and ground visibility. An additional inspection was completed on November 12, 2021

The subject property was under cultivation. The area was generally level. There were tree stands in the centre of the property as well as along the east property line, and in some places along the west property line. The treed area in the central portion of the property was fenced off and had a large ponded area. It appears that the farmstead that was in the quarter section that makes up the property has been subdivided out and is no longer part of the subject property.

To the north, east, and south were fields under cultivation. Foothills Natural Gas Co-op had warning signs for a natural Gas Pipeline on the adjacent site to the south. Adjacent to the west were newer rural residences and a Golf Course.

4.0 CONCLUSIONS AND RECOMMENDATIONS

A Phase I Environmental Site Assessment was conducted for 50.75 ha cultivated land located at NW 2-33-1 W5M in Mountain View County, Alberta.

The purpose of the Phase I Environmental Site Assessment was to determine, on the balance of probabilities, whether there was likely to be significant environmental liability associated with this property. Environmental assessment of this property was required to support development of the subject property.

Readily available relevant information was gathered and interpreted. In addition, a site tour and site inspection were conducted. All areas of the property were accessible during the site inspection.

4.1 Onsite sources of Contamination

The subject property has been consistently used for agricultural purposes. There appears to have been no other uses associated with the property except the two natural gas pipelines located along the east portion of the property. However, these are considered low risk. Hazardous building materials are not of concern since no buildings were present on the subject property.

4.2 Offsite Sources of Contamination

The only activity within 300 m of the subject property that could have the potential for contaminant migration onto the subject property was the well site located at 14-2-33-1 W5M, adjacent to the subject property. The well was a sweet gas well and was drilled in 2004. Based on the available records, it appears to only have produced until 2007 before being shut in in 2010. It was abandoned in 2018. This well appears to be in the process of reclamation, as no reclamation certificate was on file. It was not possible to obtain the Tour Report for this well within a reasonable time frame.

In light of the regulatory requirements in place during the period in which this well was operated and abandoned, it seems reasonable to assume that the likelihood that potential contaminants of concern affecting the subject property is relatively low. Given that there is a fence between NW 2 and NE 2, the possibility of drilling fluids disposal on the subject property is extremely remote.

4.3 Recommendations

In summary, there was no evidence of significant environmental liabilities associated with the subject property. The need for more invasive Phase II Environmental Site Assessment does not appear warranted, nor is any recommended, at this time.

Any groundwater source wells found on the subject propertyy should be decommissioned by a certified driller. Groundwater wells are a potential pathway for migration of contamination into the subsurface and may pose a safety hazard.

In the very unlikely event that any buried foreign materials, stained or noxious smelling soils are encountered during site development, a qualified environmental consultant should be contacted to determine whether there is a significant environmental concern associated with these materials, and the proper means of disposal. In the very unlikely event that drilling fluids are encountered, the Alberta Energy Regulator should be contacted and informed, so this can be resolved during the wellsite reclamation certification process.

5.0 CLOSURE

This report is respectfully submitted to Greg Brown of B&A Planning Group. We trust that this report suits your present requirements. Should you have any questions, please do not hesitate to contact us.

Prepared by:

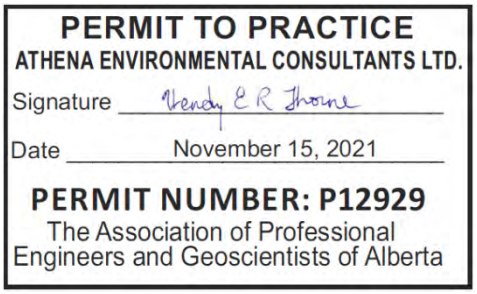


15 November 2021
Natasha M. Pitt,
B.Sc., P.Chem.

Reviewed by:



15 November 2021
Wendy E.R. Thorne,
B.A.Sc., M.E.Des., P.Eng.



Athena Environmental Consultants Ltd.

6.0 LIMITATIONS

This assessment update was based on the results acquired using the methodology set out in this report. Information provided to us by the current owner of the property, government records and databases, and statements made by government officials, was assumed to be correct. Except as stated, Athena Environmental Consultants Ltd. did not make an independent verification of historical or analytical results provided by third parties.

The opinions in this report were prepared using scientific judgment, principles, and practices, following the generally accepted methods of environmental science. However, because of the inherent uncertainty in this process, no guarantee of conclusion was intended nor can be given. All findings and conclusions stated in this report were based on facts and circumstances as they existed during the time period of the assessment, and on visual observations made of the site, as available or possible within the limits of the mutually agreed upon scope of work, budget, schedule and time of year. The conclusions of this report did not apply to any areas of the site not available for testing or inspection.

This report was prepared taking into account current government regulations, but does not constitute a thorough regulatory review and does not reflect regulations that may be enacted in the future.

This report was not intended to be exhaustive in scope, nor imply a risk-free facility. Any change in fact or circumstances upon which this report is based may adversely affect the expressed findings and conclusions.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Athena Environmental Consultants Ltd. makes no representation of fact or opinion of any nature whatsoever to any person other than the company, organization, or individual to whom this report is addressed. We accept no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken, based on this report.

7.0 REFERENCES

Agriculture and Agri-Food Canada. (2013). The Canadian System of Soil Classification, 3rd edition. Retrieved from http://sis.agr.gc.ca/cansis/taxa/cssc3/index.html.

Alberta Agriculture and Forestry. (2018). Alberta Soil Information Viewer. [Map illustrates soil type for NW-2-33-1-W5M]. Retrieved from https://soil.agric.gov.ab.ca/agrasidviewer/. 15 July, 2021.

Alberta Energy Regulator. (2017). Abandoned Well Map. [Map illustrates abandoned wells for NW-2-33-1-W5M]. Retrieved from https://www1.aer.ca/onestop/. 15 July, 2021.

Alberta Energy Regulator. (2017). OneStop Public Map Viewer. [Map illustrates oil and gas assets for NW-2-33-1-W5M]. Retrieved from https://www1.aer.ca/onestop/. 15 July, 2021.

Alberta Environment and Parks. (2017). Environmental Records from the Environmental Site Assessment Repository (ESAR). [Map illustrates environmental records for NW-2-33-1-W5M]. Retrieved from http://www.esar.alberta.ca/. 15 July, 2021.

Alberta Environment and Parks. (2017). Flood Hazard Map Application. [Map illustrates waterbodies,floodway, and flood fringe for NW-2-33-1-W5M]. Retrieved from http://maps.srd.alberta.ca/FloodHazard/. 15 July, 2021.

Alberta Environment and Parks. (2015). Alberta Water Well Information Database. [Map illustrates water wells for NW-2-33-1-W5M]. Retrieved from http://groundwater.alberta.ca/WaterWells/d/. 15 July, 2021.

Alberta Environment and Parks. (2018). Alberta Merged Wetland Inventory (AMWI). [Map illustrates wetlands and their classifications for NW-2-33-1-W5M]. Retrieved from https://geodiscover.alberta.ca/geoportal/. 15 July, 2021.

Alberta Government. (1988). HELP: Help End Landfill Pollution: Data Tracking & Management Control System. Retrieved from

Government of Canada. (2017). National Pollutant Release Inventory (NPRI) Data Search. Retrieved from https://pollution-waste.canada.ca/national-release-inventory/archives/index.cfm?lang=en.

MacLaren Plansearch Lavalin. (1982). Identification and Verification of Active and Inactive Land Disposal Sites in Alberta. Retrieved from https://open.alberta.ca/publications/533376.

Moran, S. R. (1986). Surface Materials of the Calgary Urban Area: Dalroy Sheet NTS 82-P/4.Ottawa: Surveys and Mapping Department of Energy, Mines and Resources. Retrieved from http://ags.aer.ca/publications/MAP_204.html.

QUALIFICATIONS OF PROJECT TEAM

Wendy E. Roberts Thorne, M.E.Des., P.Eng. previously managed environmental services in Alberta with Williams Engineering Canada Inc. She was formerly a Principal with Biophilia Inc., an environmental engineering consulting firm specializing in environmental management. She has over thirty years of experience in the assessment and mitigation of environmental impacts from a variety of industries. She has managed projects as diverse as development of environmental management systems; site audits and assessments; determination of risk-based remediation criteria; identification and evaluation of remedial options; investigation of revegetation problems; waste disposal; emergency response planning; spill response reporting and follow-up; investigation and resolution of odour complaints; regulatory approvals; and environmental research.

Ms. Thorne is a member of the Canadian Prairie and Northern Section of the Air and Waste Management Association. She has been a technical reviewer for the American Society for Testing of Materials. Ms. Thorne received a B.A.Sc. in Bio-Resource Engineering from U.B.C. in 1981; and an M.E.Des. (Environmental Science) from U. of C. in 1990, where she was awarded the Faculty of Environmental Design Gold Medal and the Graduate Student Thesis Award from the Canadian Land Reclamation Association. She was included in “Alberta Women of Distinction in Science and Technology”, prepared by the Premier’s Council on Science and Technology in 1994. She has been registered as a Professional Engineer in the Province of Alberta since 1983.

Natasha M. Pitt, B.Sc., P. Chem. has seven years of experience in environmental management. Ms. Pitt’s previous experience was with Williams Engineering Canada Inc. as an Environmental Scientist specializing in Phase I and II ESAs. Prior to this she was an inorganic analyst in an environmental laboratory, where she was responsible for both soil and water analysis for a wide variety of analytical parameters. She conducted method development and validation for low level mercury analysis in both air and water. She also assisted clients with questions relating to data interpretation, and was responsible for administration of the laboratory safety program. She is a graduate of Thompson Rivers University, where she majored in Environmental Chemistry, and received a Silver Medal for academic standing from the Canadian Society for Chemistry. She is currently completing an Environmental Management certificate from the University of Calgary, and is a co-instructor at the University of Calgary. She provides project support with responsibility for site inspections, database searches, sample collection, data analysis and interpretation, and report preparation. Ms. Pitt has been registered as a Professional Chemist in the Province of Alberta since 2012. Ms. Pitt is responsible for project planning and co-ordination of field work, and provides backup for Ms. Thorne.

Athena Environmental Consultants Ltd. was incorporated and obtained a Permit to Practice from APEGA in December 2014.

APPENDIX I

Figures

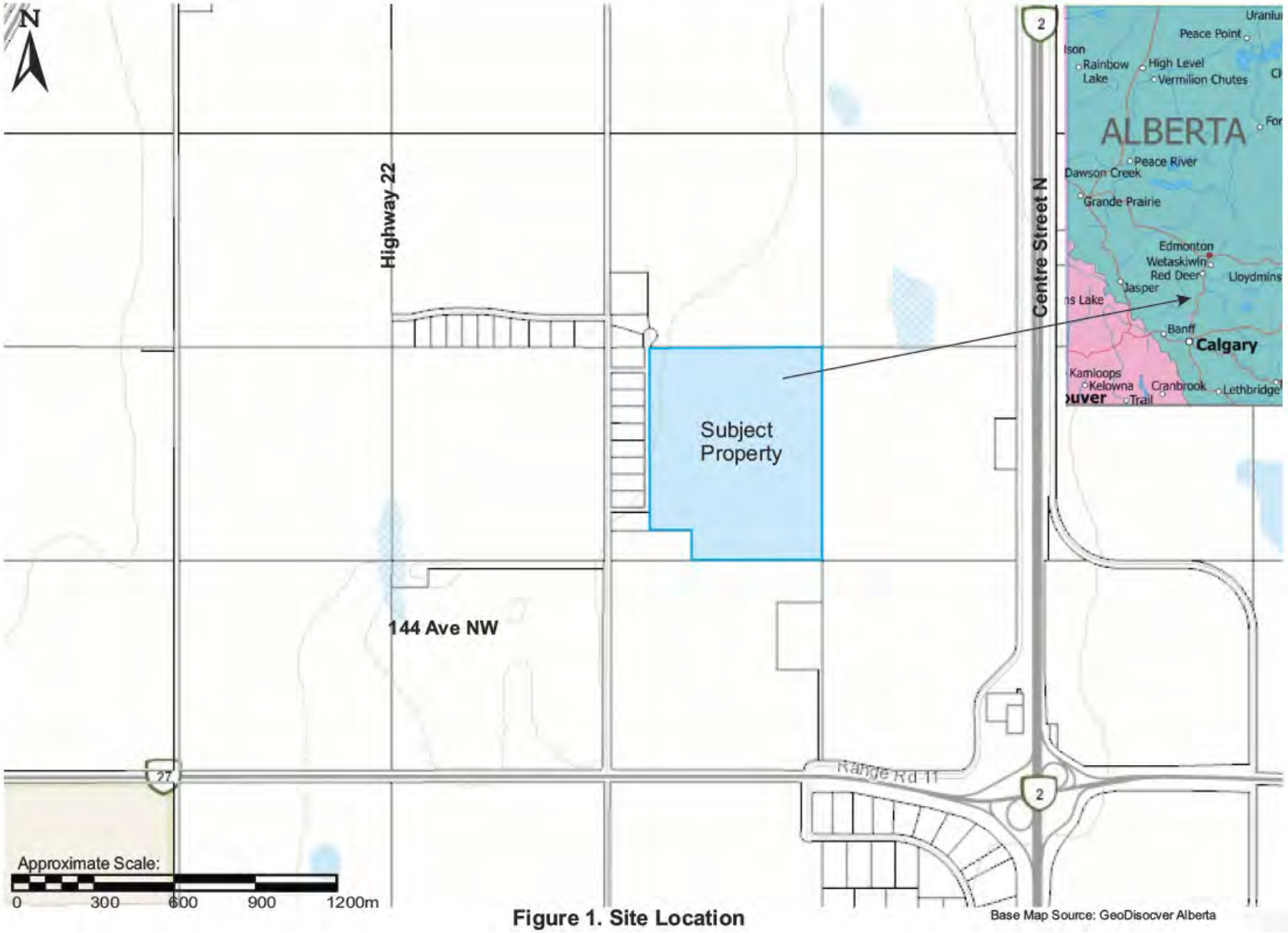


Figure 1. Site Location

Base Map Source: GeoDiscover Alberta

APPENDIX II

Photos



Photo 1: Access Point for the Subject Property, with Foothills Natural Gas Pipeline Sign Showing Pipeline Location on Adjacent Property



Photo 2: Subject Property, View to the East



Photo 3: Southeast Portion of the Subject Property



Photo 4: Area North of the Subject Property



Photo 5: Rural Residence Located to the West of the Subject Property

APPENDIX III

Search Results

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0028 726 164	5;1;33;2;NW	081 049 654

LEGAL DESCRIPTION

MERIDIAN 5 RANGE 1 TOWNSHIP 33
SECTION 2
QUARTER NORTH WEST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT:

PLAN	NUMBER	HECTARES	(ACRES)	MORE OR LESS
ROAD	8110708	0.417	1.03	
SUBDIVISION	9910326	3.415	8.44	
SUBDIVISION	9911244	5.30	13.1	
SUBDIVISION	0110320	4.815	11.9	

EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

MUNICIPALITY: MOUNTAIN VIEW COUNTY

REFERENCE NUMBER: 011 026 121 +6

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
081 049 654	06/02/2008	TRANSFER OF LAND	$2,000,000	$2,000,000

OWNERS

ABE NEUFELD
OF C/O STYLE REALTY INC
BOX 35009, SARCEE POSTAL OUTLET
CALGARY
ALBERTA T3E 7C7
AS TO AN UNDIVIDED 42.5% INTEREST

1273927 ALBERTA LTD.
OF C/O STYLE REALTY INC.
PO BOX 35009
SARCEE POSTAL OUTLET
CALGARY
ALBERTA T3E 7C7
AS TO AN UNDIVIDED 42.5% INTEREST

(CONTINUED)

404048 ALBERTA LTD.
OF C/O STYLE REALTY INC.
PO BOX 35009
SARCEE POSTAL OUTLET
CALGARY
ALBERTA T3E 7C7
AS TO AN UNDIVIDED 15% INTEREST

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
751 055 787	06/06/1975	UTILITY RIGHT OF WAY GRANTEE - FOOTHILLS NATURAL GAS CO-OP LTD.
991 103 985	20/04/1999	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - MOUNTAIN VIEW COUNTY. BAG 100 DIDSBURY ALBERTA T0M0W0 AGENT - HAROLD JOHNSRUDE
011 026 120	26/01/2001	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - MOUNTAIN VIEW COUNTY. BAG 100 DIDSBURY ALBERTA T0M0W0 AGENT - JOHN RUSLING

TOTAL INSTRUMENTS: 003

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 30 DAY OF JUNE, 2021 AT 03:19 P.M.

ORDER NUMBER: 42055901

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

(CONTINUED)

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER, SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION, APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).

HISTORICAL LAND TITLE CERTIFICATE

TITLE CANCELLED ON FEBRUARY 06,2008

S

LINC	SHORT LEGAL	TITLE NUMBER
0028 726 164	5;1;33;2;NW	011 026 121 +6

LEGAL DESCRIPTION

MERIDIAN 5 RANGE 1 TOWNSHIP 33
SECTION 2
QUARTER NORTH WEST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT:

PLAN	NUMBER	HECTARES	(ACRES)	MORE OR LESS
ROAD	8110708	0.417	1.03	
SUBDIVISION	9910326	3.415	8.44	
SUBDIVISION	9911244	5.30	13.1	
SUBDIVISION	0110320	4.815	11.9	

EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

MUNICIPALITY: MOUNTAIN VIEW COUNTY

REFERENCE NUMBER: 991 103 986 +4

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
011 026 121	26/01/2001	SUBDIVISION PLAN		

OWNERS

WILFRED MOONEY BURTON (FARMER)
OF BOX 6,SITE 2 RR#1
OLDS
ALBERTA T4H 1P2

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
751 055 787	06/06/1975	UTILITY RIGHT OF WAY GRANTEE - FOOTHILLS NATURAL GAS CO-OP LTD.

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
971 293 600	02/10/1997	CAVEAT RE : SEE CAVEAT CAVEATOR - COPPER CROWN HOLDINGS LTD. C/O MARTINSON & HARDER 6, 5221-46 STREET OLDS ALBERTA T4H1T5 AGENT - DOUGLAS S MARTINSON
991 103 985	20/04/1999	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - MOUNTAIN VIEW COUNTY. BAG 100 DIDSBURY ALBERTA T0M0W0 AGENT - HAROLD JOHNSRUDE
011 026 120	26/01/2001	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - MOUNTAIN VIEW COUNTY. BAG 100 DIDSBURY ALBERTA T0M0W0 AGENT - JOHN RUSLING
011 372 504	12/12/2001	CAVEAT RE : AGREEMENT CHARGING LAND CAVEATOR - CANADIAN IMPERIAL BANK OF COMMERCE. 4513-52 AVE OLDS ALBERTA T4H1M8 AGENT - CURTIS FLEWELLING
071 551 981	09/11/2007	CAVEAT RE : AGREEMENT CHARGING LAND CAVEATOR - MOUNTAIN VIEW CREDIT UNION, LIMITED. BOX 3770 OLDS ALBERTA T4H1P5 AGENT - BETTY BARIL
081 049 654	06/02/2008	TRANSFER OF LAND OWNERS - ABE NEUFELD C/O STYLE REALTY INC BOX 35009, SARCEE POSTAL OUTLET CALGARY ALBERTA T3E7C7

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS

AS TO 42.5%
OWNERS - 1273927 ALBERTA LTD.
C/O STYLE REALTY INC.
PO BOX 35009
SARCEE POSTAL OUTLET
CALGARY
ALBERTA T3E7C7
AS TO 42.5%
OWNERS - 404048 ALBERTA LTD.
C/O STYLE REALTY INC.
PO BOX 35009
SARCEE POSTAL OUTLET
CALGARY
ALBERTA T3E7C7
AS TO 15%
NEW TITLE ISSUED

TOTAL INSTRUMENTS: 007

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 30 DAY OF JUNE, 2021 AT 03:19 P.M.

ORDER NUMBER: 42055901

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER, SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION, APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).

HISTORICAL LAND TITLE CERTIFICATE

TITLE CANCELLED ON JANUARY 26,2001

S

LINC	SHORT LEGAL	TITLE NUMBER
0027 922 624	5;1;33;2;NW	991 103 986 +4

LEGAL DESCRIPTION

MERIDIAN 5 RANGE 1 TOWNSHIP 33
SECTION 2
QUARTER NORTH WEST
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT:

PLAN	NUMBER	HECTARES	(ACRES)	MORE OR LESS
ROAD	8110708	0.417	1.03	
SUBDIVISION	9910326	3.415	8.44	
SUBDIVISION	9911244	5.30	13.1	

EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

MUNICIPALITY: MOUNTAIN VIEW COUNTY

REFERENCE NUMBER: 991 024 133 +1

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
991 103 986	20/04/1999	SUBDIVISION PLAN		

OWNERS

WILFRED MOONEY BURTON (FARMER)
OF BOX 6,SITE 2 RR#1
OLDS
ALBERTA T4H 1P2

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
751 055 787	06/06/1975	UTILITY RIGHT OF WAY GRANTEE - FOOTHILLS NATURAL GAS CO-OP LTD.

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
861 204 163	10/12/1986	MORTGAGE MORTGAGEE - ROYAL BANK OF CANADA. BOX 1138 OLDS ALBERTA ORIGINAL PRINCIPAL AMOUNT: $200,000
971 293 600	02/10/1997	CAVEAT RE : SEE CAVEAT CAVEATOR - COPPER CROWN HOLDINGS LTD. C/O MARTINSON & HARDER 6, 5221-46 STREET OLDS ALBERTA T4H1T5 AGENT - DOUGLAS S MARTINSON
991 103 985	20/04/1999	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - MOUNTAIN VIEW COUNTY. BAG 100 DIDSBURY ALBERTA T0M0W0 AGENT - HAROLD JOHNSRUDE (DATA UPDATED BY: 991104106)
991 104 106	20/04/1999	CORRECTION OF INSTRUMENT AFFECTS INSTRUMENT: 991103985 AFFECTED PARTY: MOUNTAIN VIEW COUNTY "ADDRESS CHANGED FROM: BAG 100 DIDSBURY TO: BAG 100;DIDSBURY PROVINCE CHANGED FROM: AB TO: AB POSTAL CODE CHANGED FROM: T4H1P2 TO: T0M0W0"
001 027 872	31/01/2000	DISCHARGE OF MORTGAGE 861204163
011 026 120	26/01/2001	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - MOUNTAIN VIEW COUNTY. BAG 100 DIDSBURY ALBERTA T0M0W0 AGENT - JOHN RUSLING
011 026 121	26/01/2001	SUBDIVISION PLAN 0110320 TITLE CANCELLED AS TO PART AND NEW TITLE ISSUED FOR THE REMAINDER

TOTAL INSTRUMENTS: 008

(CONTINUED)

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 30 DAY OF JUNE, 2021 AT 03:19 P.M.

ORDER NUMBER: 42055901

CUSTOMER FILE NUMBER:

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HISTORICAL LAND TITLE CERTIFICATE

TITLE CANCELLED ON APRIL 20,1999

S

LINC	SHORT LEGAL	TITLE NUMBER
0027 826 750	5;1;33;2;NW	991 024 133 +1

LEGAL DESCRIPTION

MERIDIAN 5 RANGE 1 TOWNSHIP 33
SECTION 2
QUARTER NORTH WEST
CONTAINING 64.7 HECTARES, (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT

PLAN	NUMBER	HECTARES	ACRES	MORE OR LESS
ROADWAY	8110708	0.417	1.03	
SUBDIVISION	9910326	3.415	8.44	

EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

MUNICIPALITY: MOUNTAIN VIEW COUNTY

REFERENCE NUMBER: 155R156 .

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
991 024 133	27/01/1999	SUBDIVISION PLAN		

OWNERS

WILFRED MOONEY BURTON (FARMER)
OF BOX 6,SITE 2 RR#1
OLDS
ALBERTA T4H 1P2

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
751 055 787	06/06/1975	UTILITY RIGHT OF WAY GRANTEE - FOOTHILLS NATURAL GAS CO-OP LTD.
861 204 163	10/12/1986	MORTGAGE

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
		MORTGAGEE - ROYAL BANK OF CANADA. BOX 1138 OLDS ALBERTA ORIGINAL PRINCIPAL AMOUNT: $200,000
971 293 600	02/10/1997	CAVEAT RE : SEE CAVEAT CAVEATOR - COPPER CROWN HOLDINGS LTD. C/O MARTINSON & HARDER 6, 5221-46 STREET OLDS ALBERTA T4H1T5 AGENT - DOUGLAS S MARTINSON
991 103 985	20/04/1999	CAVEAT RE : DEVELOPMENT AGREEMENT PURSUANT TO MUNICIPAL GOVERNMENT ACT CAVEATOR - MOUNTAIN VIEW COUNTY. BAG 100 DIDSBURY ALBERTA T4H1P2 AGENT - HAROLD JOHNSRUDE
991 103 986	20/04/1999	SUBDIVISION PLAN 9911244 TITLE CANCELLED AS TO PART AND NEW TITLE ISSUED FOR THE REMAINDER

TOTAL INSTRUMENTS: 005

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 30 DAY OF JUNE, 2021 AT 03:19 P.M.

ORDER NUMBER: 42055901

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

(CONTINUED)

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HISTORICAL LAND TITLE CERTIFICATE

TITLE CANCELLED ON JANUARY 27,1999

S

LINC	SHORT LEGAL	TITLE NUMBER
0021 154 901	5;1;33;2;NW	155R156 .

LEGAL DESCRIPTION

MERIDIAN 5 RANGE 1 TOWNSHIP 33
SECTION 2
QUARTER NORTH WEST
CONTAINING 64.7 HECTARES, (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT

PLAN	NUMBER	HECTARES	ACRES
ROADWAY	8110708	0.417	(1.03)

EXCEPTING THEREOUT ALL MINES AND MINERALS

ESTATE: FEE SIMPLE

MUNICIPALITY: MOUNTAIN VIEW COUNTY

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
155R156 .	13/02/1969		$18,000	REF. 7077KG

OWNERS

WILFRED MOONEY BURTON (FARMER)
OF BOX 6,SITE 2 RR#1
OLDS
ALBERTA T4H 1P2
(DATA UPDATED BY: CHANGE OF ADDRESS 951106459)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
751 055 787	06/06/1975	UTILITY RIGHT OF WAY GRANTEE - FOOTHILLS NATURAL GAS CO-OP LTD.
791 163 820	02/10/1979	MORTGAGE MORTGAGEE - ROYAL BANK OF CANADA. ORIGINAL PRINCIPAL AMOUNT: $104,000

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
861 204 163	10/12/1986	MORTGAGE MORTGAGEE - ROYAL BANK OF CANADA. BOX 1138 OLDS ALBERTA ORIGINAL PRINCIPAL AMOUNT: $200,000
951 106 459	11/05/1995	CHANGE OF ADDRESS FOR SERVICE RE: WILFRED MOONEY BURTON (FARMER) BOX 6,SITE 2 RR#1 OLDS ALBERTA T4H1P2 AFFECTS INSTRUMENT: 155R156 .
951 275 121	01/12/1995	DISCHARGE OF MORTGAGE 791163820
971 293 600	02/10/1997	CAVEAT RE : SEE CAVEAT CAVEATOR - COPPER CROWN HOLDINGS LTD. C/O MARTINSON & HARDER 6, 5221-46 STREET OLDS ALBERTA T4H1T5 AGENT - DOUGLAS S MARTINSON
991 024 133	27/01/1999	SUBDIVISION PLAN 9910326 TITLE CANCELLED AS TO PART AND NEW TITLE ISSUED FOR THE REMAINDER

TOTAL INSTRUMENTS: 007

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 30 DAY OF JUNE, 2021 AT 03:19 P.M.

ORDER NUMBER: 42055901

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

(CONTINUED)

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER, SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

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Alberta Government

Service Request

Land Titles

Box 7575 Calgary
Alberta T2P 2R4
Telephone (403) 297-6511

Box 2380 Edmonton
Alberta T5J 2T3
Telephone (780) 427-2742

Name: Athena Environmental Consultants LTD

Account or Party Code No.

Cheque Cash

Address: 364 Spruce Street Springbrook AB

Postal Code: T4S 0P1

Amount Enclosed: 150.00 ~~100.00~~ MC

Customer's File No.: 21-0018

Return By Fax | Call Box No. | Mail Courier

Select One

Date: year 2021 month 06 day 30

Email: npitt@athena-env.ca

Signature of Requester: Natasha M Pitt

Fax No.

Telephone No.: 403-561-2513

Print Name: Natasha M Pitt

Quantity	Code	Description	Fees
	HIST	NW 2-33-1 WSM Back to patent.	

MICT 150

PREPAYMENT RECEIVED
JUL 09 2021
CHQ - $150.00

JUL 12 2021

TOTAL FEES 150

Code
Type of Service Requested

ANAM..... ALTA Name Search
HIST..... Copy of Historical Title
CPLA..... Certified Copy of Plan
BULK..... Bulk Data Service
CODO..... Copy of Document

CCOD..... Certified Copy of Document
PLAO..... Copy of Plan - Ozalid
PLAM..... Copy of Plan - Mylar
MISC..... Miscellaneous Services

L.T.O. Staff Initials

This information is being collected for the purposes of land titles records in accordance with the Land Titles Act. Questions about the collection of this information can be directed to the Freedom of Information and Protection of Privacy Coordinator for the Alberta Government, Box 3140, Edmonton, Alberta, T5J 2G7, (780) 427-2742.

7427485

REG 3053 (2014/09)

Land Titles Office

LAND TITLES ACT, Sec. 64 — The land mentioned in any certificate of title granted under this Act shall by implication and without any special mention therein, be subject to—
(a) Any subsisting reservations or exceptions including royalties contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement, however created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any decrees, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may by statute be vested in any person, body corporate, or Her Majesty;
(g) Any right-of-way or other easement granted or acquired under the provisions of any Act or law in force in the Province.

155 R 156

FB

Issued on instrument registered at 10.17 o'clock A m. on the 13 day of FEBRUARY A.D. 19 69
Number 7077 Book K.G. Folio 200
H. E. HC COMBS
Registrar, S.A.L.R.D.

Certificate of Title

Assoc. Fund Value $18,000.00

Refer Cert. No. 124 R 65

South Alberta Land Registration District

This is to Certify that WILFRED MOONEY BURTON OF OLDS IN THE PROVINCE OF ALBERTA (FARMER)

is now the owner of an estate in fee simple of and in THE NORTH WEST QUARTER OF SECTION TWO (2) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCE OF ALBERTA , CONTAINING ONE HUNDRED AND SIXTY (160) ACRES MORE OR LESS ,

RESERVING UNTO HER MAJESTY ALL MINES AND MINERALS .

CANCELLED ON RENEWAL
DATED 20-1-69 12-71
REG.

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this THIRTEENTH day of FEBRUARY A.D. 19 69

B Jones as Registrar
South Alberta Land Registration District

P.O. Address OLDS , ALBERTA

MORTGAGE: WILFRED MOONEY BURTON TO THE PRUDENTIAL INSURANCE COMPANY OF AMERICA $40,000.00
INT. 9 %, 21 NOVEMBER 1968 , 10.18 A.M., 13 FEBRUARY 1969.....7078 K.G.
B Jones AD.REG.

OVER

CAVEAT: THE PRUDENTIAL INSURANCE COMPANY OF AMERICA , 10 FEBRUARY 1969 , 10.19 A.M., 13 FEBRUARY 1969,
.....7079 K.G.

AD.REG.

NOTIFICATION (TAX RECOVERY ACT) BY County Mountain View #17

Dated 23/3/72 Reg'd 11:36 A.M. 4/4/72 as No. 1146 J.J.

WITHDRAWAL OF TAX NOTIFICATION 1146 J Dated —

Registered at — A.M. P.M. 21 Dec 12:23 as No. 73-168532 1

Mortgage — The Royal Bank of Canada — $22,500.00 — 25 Jan. 1974 —
74-1007645

LAND TITLES ACT, Sec. 84 — The land mentioned in any certificate of title granted under this Act shall by implication and without any special mention therein, be subject to—

(a) Any subsisting reservations or exceptions including royalties contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement, howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any decrees, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may by statute be vested in any person, body corporate, or Her Majesty;
(g) Any right-of-way or other easement created or acquired under the provisions of any Act or law in force in the Province.

124 R 65

GOVERNMENT OF THE PROVINCE OF ALBERTA

HM

PB

Issued on instrument registered at 10.28 o'clock
A m. on the 8 day of NOVEMBER
A.D. 19 61
Number 8528 Book E Folio 235
H.E. MC COMBS
Registrar, S A L R D

Certificate of Title

Assce. Fund Value $ 18,000.00

Refer Cert. No. 118 R 140

South Alberta Land Registration District

This is to Certify that HENRY MELLENDORF OF OLDS IN THE PROVINCE OF ALBERTA (FARMER)

is now the owner of an estate in fee simple

of and in THE NORTH WEST QUARTER OF SECTION TWO(2) IN TOWNSHIP THIRTY THREE(33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCE OF ALBERTA, CONTAINING ONE HUNDRED AND SIXTY (160) ACRES MORE OR LESS.

RESERVING UNTO HER MAJESTY ALL MINES AND MINERALS, AND

Cancelled

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this EIGHTH day of NOVEMBER A.D. 1961

D. Morgan Registrar

South Alberta Land Registration District

P.O. Address OLDS, ALBERTA

NOTIFICATION (TAX RECOVERY ACT) BY Land Titles Division #1

Issued 28 Nov 1963 Reg'd 10 37 A.M. Under Sec. 163 as No. 173 J.J.

OVER

Caveat Wilfred Murray Burton — 5 Jan 1962 — 11 23 am 26 June 1963 — 6223 I.R.

W Mawson

WITHDRAWAL OF TAX NOTIFICATION No. 123 J.J. Dated 27 Nov 1964

Registered at 11 12 A.M. 11 Dec 1964 as No. 4812 J.C.

NOTIFICATION (TAX RECOVERY ACT)

BY County of Mountain View No 17

DATED 5-3-65 REG'D 10 33 A.M. 1-4-65 AS NO. 2334

WITHDRAWAL OF TAX NOTIFICATION No. 223 J.J Dated 20/4/1965

Registered at 10 19 A.M. 26 MAY 1965 as No. 9099 J.E

Caveat The Bank of New Scotia 2 April 1966 — 10 27 AM 4 May 1966 — 8777 J.L.

Caveat Alder-Operating Public Trustee for the Province of Alberta & a Committee for the Estate of Murray Hilliard of — 5 Feb. 1968 — 10 6 Pm — 21 Feb 1968 — 4296 JX

WITHDRAWAL OF TAX NOTIFICATION No. County of Mountain View No 17

Dated 24 March 1966 11 23 A.M. 18 April 1968 as No. 663 J.J

WITHDRAWAL OF [illegible] 663 JJ Dated 8 Jan 1969

Registered at 11 04 A.M. 10 Jan 1969 as No. 0609 K.F.

Withdrawal of Caveat 8777 JL — 15 Jan 1969 — 10 46 AM — 13 Feb 1969 — 7076 KG

THIS CERT. OF TITLE IS CANCELLED in full

In accordance with the transfer, subject to any exceptions and/or reservations therein and a new Certificate of Title No. 155 R 156

Issued this 13 day of Feb 1969 to Wilfred Murray Burton

D. B. 7077 KG A/D. Reg.

LAND TITLES ACT, Sec. 61 — The land mentioned in any certificate of title granted under this Act shall be held by implication and without any special mention therein, be subject to—

(a) Any subsisting reservations or exceptions including royalties contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement, howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any decrees, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may by statute be vested in any person, body corporate, or Her Majesty;
(g) Any right-of-way or other easement created or required under the provisions of any Act or law in force in the Province.

118 R 140

GOVERNMENT OF THE PROVINCE OF ALBERTA

Issued on instrument registered at 1.26 o'clock P.m. on the 25 day of APRIL A.D. 1960
Number 8946 Book H.T.C. Folio 242
R.B.HALL
Registrar, S.A.L.R.D.

W.W.

Certificate of Title

Assce. Fund Value $18000.00 Refer Cert. No. 106 0 58

South Alberta Land Registration District.

This is to Certify that STEFAN KUPYNA

OF OLDS IN THE PROVINCE OF ALBERTA (FARMER)

is now the owner of an estate in fee simple

of and in THE NORTH WEST QUARTER OF SECTION TWO (2) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCE OF ALBERTA, CONTAINING ONE HUNDRED AND SIXTY (160) ACRES MORE OR LESS.

RESERVING UNTO HER MAJESTY ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME, AND

CANCELLED

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this TWENTY FIFTH day of APRIL A.D. 1960

B. Jones Asst. Registrar

South Alberta Land Registration District

P.O. Address OLDS, ALBERTA

OVER

OVER

THIS CERT. OF TITLE IS CANCELLED IN FULL

in accordance with the transfer, subject to any exceptions and/or reservations therein and a new Certificate of Title No. 124 R 65

issued this 8 day of NOV. 1961 to HENRY MELLENDORF

D. B. 8528 I.E. W J Murray A. D. Reg.

106 0 58

58

LAND TITLES ACT, Sec. 61.—The land mentioned in any certificate of title granted under this Act shall be held subject to—

(a) Any subsisting reservations or exceptions including royalties contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement, howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any decrees, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may by statute be vested in any person, body corporate, or Her Majesty;
(g) Any right-of-way or other easement granted or acquired under the provisions of any Act or law in force in the Province.

GOVERNMENT OF THE PROVINCE OF ALBERTA

PH

Issued on instrument registered at 11.17 o'clock A. m. on the 27 day of MARCH A.D. 19 57
Number 1977 Book H.O. Folio 31
A.B. HALL
Registrar, S.A.L.R.D.

Certificate of Title

Assce. Fund Value $7675.00
Unearned Inc. Value

Refer Cert. No. 106 0 56

South Alberta Land Registration District.

This is to Certify that OLIVER LOUIS MORITZ OF OLDS, IN THE PROVINCE OF ALBERTA (FARMER) AND KATHRYN ALICE MORITZ OF THE SAME PLACE (HIS WIFE)

~~is~~ are now the owners of an estate in fee simple AS JOINT TENANTS

of and in THE NORTH WEST QUARTER OF SECTION TWO (2) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCE OF ALBERTA CONTAINING ONE HUNDRED AND SIXTY (160) ACRES MORE OR LESS.

RESERVING UNTO HER MAJESTY ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME, AND

CANCELLED

NO ENDORSEMENTS ON BACK OF TITLE

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this TWENTY SEVENTH day of MARCH A.D. 19 57

Registrar
South Alberta Land Registration District

P.O. Address OLDS, ALBERTA

THIS CERT. OF TITLE IS CANCELLED dm pgff
In accordance with the transfer, subject to any exceptions and/or reservations therein and a new certificate of title No. 118 R 140 issued this 25 day of APR. 19 60 to STEFAN KUPYNA
D.B. 2946 H.T.
A.A.R.D. Reg.

OVER

106 0 56

56

LAND TITLES ACT, Sec. 61.—The land mentioned in any certificate of title granted under this Act shall by implication and without any special mention therein, be subject to—

(a) Any subsisting reservations or exceptions including royalties contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement, howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any decrees, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may by statute be vested in any person, body corporate, or the Railways;
(g) Any right-of-way or other easement created or acquired under the provisions of any Act or law in force in the Province.

GOVERNMENT OF THE PROVINCE OF ALBERTA

PH

Issued on instrument registered at 11.15 o'clock A m. on the 27 day of MARCH A.D. 19 57
Number 1075 Book H.G. Folio 31
R.B. HALL
Registrar, T.S.L.R.D.

Certificate of Title

Assce. Fund Value $11200.00
Unearned Ins. Value

Refer Cert. No. 78 N 10

South Alberta Land Registration District

This is to Certify that KATHRYN ALICE MORITZ (MARRIED WOMAN), WIFE OF OLIVER LOUIS MORITZ (FARMER), EDWIN L. BENTZ (FARMER) BOTH OF OLDS, IN THE PROVINCE OF ALBERTA AND MARVIN LESTER BENTZ OF RIDDLE, IN THE STATE OF OREGON, ONE OF THE UNITED STATES OF AMERICA

are now the owners of an estate in fee simple

of and in THE WEST HALF OF SECTION TWO (2) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCE OF ALBERTA CONTAINING THREE HUNDRED AND TWENTY (320) ACRES MORE OR LESS.

EXCEPTING OUT OF THE SOUTH WEST QUARTER FIFTY HUNDREDTHS (0.50) OF AN ACRE MORE OR LESS FOR A ROADWAY AS SHOWN ON A PLAN FILED IN THE LAND TITLES OFFICE FOR THE SOUTH ALBERTA LAND REGISTRATION DISTRICT AS 2360 E.Z. AND

RESERVING UNTO HER MAJESTY ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME, AND

NO ENDORSEMENTS ON BACK OF TITLE

THIS CERT. OF TITLE IS CANCELLED AS TO NW 1/4
in accordance with the transfer, subject to any exceptions and/or reservations therein and a new Certificate of Title No. 106 0 58
issued this 27 day of MCH 1957 to OLIVER L. MORITZ ET UX.
D. B. 1077 H.G. A.D. Reg.

CANCELLED

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this TWENTY SEVENTH day of MARCH A.D. 1957

Registrar
South Alberta Land Registration District

P.O. Address

SW 1/4 CAVEAT MINISTER OF HIGHWAYS 8 JUNE 1955 3.07 PM. 9 JUNE 1955, ...1447 H.X.

THIS CERT. OF TITLE IS CANCELLED AS TO SW 1/4 & IN FULL
in accordance with the transfer, subject to any exceptions and/or reservations therein and a new Certificate of Title No. 106 0 59
issued this 27 day of MCH 1957 to EDWIN L. BENTZ.
D. B. 1078 H.G. A.D. Reg.

OVER

LAND TITLES ACT, Sec. 81—The land mentioned in any certificate of title granted under this Act shall be held subject to such exceptions as may be mentioned therein, unless the contrary is expressly declared, but subject to—

(a) Any subsisting reservations or exceptions contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement, howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any decrees, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may by statute be vested in any person, body corporate, or His Majesty;
(g) Any right-of-way or other easement granted or acquired under the provisions of any Act or law in force in the Province.

10 10

GOVERNMENT OF THE PROVINCE OF ALBERTA

RJ

Issued on instrument registered at 10.47 o'clock A m. on the 13 day of FEBRUARY A.D. 19 48 Number 6987 Book F.S. Folio 196 W. FORBES Registrar S.A.L.R.D.

Certificate of Title

Assce. Fund Value $11200.00
Unearned Ins. Value $7050.00

Refer Cert. No. 78 N.6

South Alberta Land Registration District.

This is to Certify that EDWIN L. BENTZ (FARMER) AND KATHRYN ALICE BENTZ (SPINSTER) BOTH OF OLDS IN THE PROVINCE OF ALBERTA AND MARVIN LESTER BENTZ OF RIDDLE IN THE STATE OF OREGON ONE OF THE UNITED STATES OF AMERICA (LOGGER)

are now the owners of an estate in fee simple

of and in THE WEST HALF OF SECTION TWO (2) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCE OF ALBERTA CONTAINING THREE HUNDRED AND TWENTY (320) ACRES MORE OR LESS,

EXCEPTING OUT OF THE SOUTH WEST QUARTER FIFTY HUNDREDTHS (0.50) OF AN ACRE MORE OR LESS FOR A ROADWAY AS SHOWN ON A PLAN FILED IN THE LAND TITLES OFFICE FOR THE SOUTH ALBERTA LAND REGISTRATION DISTRICT AS 2360 E.Z.

RESERVING UNTO HIS MAJESTY ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME, AND

CANCELLED

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this THIRTEENTH day of FEBRUARY A.D. 19 48

A. J. Moore Registrar
South Alberta Land Registration District.

P.O. Address

S.W.¼ Caveat - Minister of Highways - 8 June 1955 - 3.07 pm - 9 June 1955 1447HX

THIS CERT. OF TI LE IS CANCELED — on Endl
On Marriage
in accordance with te Inst ... exceptions and/or reservations therein and a new ... No. 106 056
issued this 27 day of Jul 1957 to Kathryn A Prentiss et al
D. B. 1075 HG ... Reg.

LAND TITLES ACT, Sec. 61.—The land mentioned in any certificate of title granted under this Act shall be held subject to—and without any special mention therein, unless the contrary is expressly declared, be subject to—
(a) Any subsisting reservations or exceptions contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement, howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any charges, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may by statute be vested in any person, body corporate, or the Minister;
(g) Any right-of-way or other easement granted or acquired under the provisions of any Act or law in force in the Province.

6 6

BJ

Issued on instrument registered at 10.45 o'clock A.M. on the 13 day of FEBRUARY A.D. 19 48 Number 6985 Book F.S. Folio 196
W. FORBES
Registrar S.A.L.R.D.

Certificate of Title

Assce. Fund Value $11200.00
Uncarned Inc. Value $7050.00

Refer Cert. No. 66 E. 185

TRANSMISSION

South Alberta Land Registration District

This is to Certify that EDWIN L. BENTZ (FARMER) AND KATHRYN ALICE BENTZ (SPINSTER) BOTH OF OLDS IN THE PROVINCE OF ALBERTA ADMINISTRATORS OF THE ESTATE OF MARY JANE BENTZ (DECEASED)

~~are~~ now the owners of an estate in fee simple AS SUCH ADMINISTRATORS,

of and in THE WEST HALF OF SECTION TWO (2) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCE OF ALBERTA CONTAINING THREE HUNDRED AND TWENTY (320) ACRES MORE OR LESS.

EXCEPTING OUT OF THE SOUTH WEST QUARTER FIFTY HUNDREDTHS (0.50) OF AN ACRE MORE OR LESS FOR A ROADWAY AS SHOWN ON A PLAN FILED IN THE LAND TITLES OFFICE FOR THE SOUTH ALBERTA LAND REGISTRATION DISTRICT AS 2360 E.Z.

RESERVING UNTO HIS MAJESTY ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME, AND

NO ENDORSEMENTS ON BACK OF TITLE

~~a new Certificate~~ 78 N.16 ~~Issue to~~
EDWIN L. BENTZ ET.AL.
under Transfer to THEM from the above named registered owner dated 10 FEB. 1948 and registered at 10.47 o'clock A.M. this 13 day of FEBRUARY A.D. 1948 as 6987 F.S.
Registrar.

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this THIRTEENTH day of FEBRUARY A.D. 1948

Registrar

P.O. Address OLDS, ALBERTA.

South Alberta Land Registration District

LAND TITLES ACT, Sec. 61.—The land mentioned in any certificate of title granted under this Act shall by implication and without any special mention therein, unless the contrary is expressly declared, be subject to—

(a) Any subsisting reservations or exceptions contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement, howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any decrees, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may by statute be vested in any person body corporate, or His Majesty;
(g) Any right-of-way or other easement granted or acquired under the provisions of any Act or law in force in the Province

66E 185

GOVERNMENT OF THE PROVINCE OF ALBERTA

BH

185

I hereby certify that the instrument registered at 2.05 o'clock P. m. on the 2 day of AUGUST A.D. 1945 Number 985 Book R.L. Folio 28 W. FORBES Registrar S.A.L.R.D.

Certificate of Title

Assce. Fund Value $11,200.00
Unearned Inc. Value $ 7,050.00

28.S.155
Refer Cert. No. 66.E.183

South Alberta Land Registration District

This is to Certify that MARY JANE BENTZ OF OLDS IN THE PROVINCE OF ALBERTA (WIDOW)

is now the owner of an estate in fee simple

of and in THE WEST HALF OF SECTION TWO (2) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCE OF ALBERTA CONTAINING THREE HUNDRED AND TWENTY (320) ACRES MORE OR LESS.

EXCEPTING OUT OF THE SOUTH WEST QUARTER FIFTY HUNDREDTHS (0.50) OF AN ACRE MORE OR LESS FOR A ROADWAY AS SHOWN ON A PLAN FILED IN THE LAND TITLES OFFICE FOR THE SOUTH ALBERTA LAND REGISTRATION DISTRICT AS 2360 E.2.

RESERVING UNTO HIS MAJESTY ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME, AND

This Certificate is cancelled
and a new Certificate 78N6 issued to
Edwin L. Bentz et al
under Transfer to Them (By Transmission)
above named registered owner dated 10 Feb 1948.
at 10:45 o'clock A.M. this 13 day of
Feb. A.D. 1948 as No. 6985FS.
B.K. Reid
Registrar

NO ENDORSEMENTS ON BACK OF TITLE

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this SECOND day of AUGUST A.D. 1945

A. E. Laverdure as Registrar
South Alberta Land Registration District

P.O. Address OLDS, ALBERTA

66E 183

LAND TITLES ACT, Sec. 88.—The land mentioned in any certificate of title granted under this Act shall be held by implication and without any special mention therein, unless the contrary is expressly declared, to be subject to—
(a) Any subsisting reservations or exceptions contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any decrees, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may by statute be vested in any person, body corporate, or His Majesty;
(g) Any right-of-way or other easement granted or acquired under the provisions of any Act or law in force in the Province.

GOVERNMENT OF THE PROVINCE OF ALBERTA

EH

183

Issued on instrument registered at 2.04 o'clock
P.M. on the 2 day of AUGUST
A.D. 1945
Under 984 Book F.L. Folio 28
W. FORBES
Registrar, S.A.L.R.D.

Certificate of Title

Assce. Fund Value $5600.00
Unearned Inc. Value $3525.00

Refer Certs. No. 66.C.161

South Alberta Land Registration District

This is to Certify that MARY JANE BENTZ OF OLDS IN THE PROVINCE OF ALBERTA (WIDOW)

is now the owner of an estate in fee simple AS TO THE INTEREST OF JOSEPH C. BENTZ UNDER CERTIFICATE OF TITLE 28.S.155

of and in THE WEST HALF OF SECTION TWO (2) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCEOF ALBERTA CONTAINING THREE HUNDRED AND TWENTY (320) ACRES MORE OR LESS,

EXCEPTING OUT OF THE SOUTH WEST QUARTER FIFTY HUNDREDTHS (0,50) OF AN ACRE MORE OR LESS FOR A ROADWAY AS SHOWN ON A PLAN FILED IN THE LAND TITLES OFFICE FOR THE SOUTH ALBERTA LAND REGISTRATION DISTRICT AS 2360 E.Z.

RESERVING UNTO HIS MAJESTY ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME, AND

NO ENDORSEMENTS ON BACK OF TITLE

Registered this 2 day of AUGUST
1945 by consolidation with certificate
28 .S.155 under certificate 66 E.185

H. Edwards Registrar

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this SECOND day of AUGUST A.D. 1945

H. Edwards ex Registrar
South Alberta Land Registration District

P.O. Address OLDS, ALBERTA

66E 183

LAND TITLES ACT, Sec. 81—The land mentioned in any certificate of title granted under this Act shall by implication and without any special mention therein, unless the contrary is expressly declared, be subject to—
(a) Any subsisting reservations or exceptions contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement, howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any decrees, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may by statute be vested in any person, body corporate, or His Majesty;
(g) Any right-of-way or other easement granted or acquired under the provisions of any Act or law in force in the Province.

EH

183

Issued on instrument registered at 2.04 o'clock P.M. on the 2 day of AUGUST A.D. 19 45 Number 984 Book F.L. Folio 28
W. FORBES
Registrar S.A.L.R.D.

Certificate of Title

Assce. Fund Value $5600.00
Unearned Ins. Value $3525.00

Refce Cert. No. 66.E.161

South Alberta Land Registration District

This is to Certify that MARY JANE BENTZ OF OLDS IN THE PROVINCE OF ALBERTA (WIDOW)

is now the owner of an estate in fee simple AS TO THE INTEREST OF JOSEPH C. BENTZ UNDER CERTIFICATE OF TITLE 28.S.155

of and in THE WEST HALF OF SECTION TWO (2) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCEOF ALBERTA CONTAINING THREE HUNDRED AND TWENTY (320) ACRES MORE OR LESS,

EXCEPTING OUT OF THE SOUTH WEST QUARTER FIFTY HUNDREDTHS (0.50) OF AN ACRE MORE OR LESS FOR A ROADWAY AS SHOWN ON A PLAN FILED IN THE LAND TITLES OFFICE FOR THE SOUTH ALBERTA LAND REGISTRATION DISTRICT AS 2360 E.Z.

RESERVING UNTO HIS MAJESTY ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME, AND

NO ENDORSEMENTS ON BACK OF TITLE

Cancelled this 2 day of AUGUST 1945 by consolidation with certificate 28 .S.155 under certificate 66.E.185

Registrar

CANCELLED

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this SECOND day of AUGUST A.D. 1945

Registrar
South Alberta Land Registration District

P.O. Address OLDS, ALBERTA

LAND TITLES ACT, Sec. 82.—The land mentioned in any certificate of title granted under this Act shall by implication and without any special mention therein, unless the contrary is expressly declared, be subject to—

(a) Any subsisting reservations or exceptions contained in the original grant of the land from the Crown;
(b) All unpaid taxes, including irrigation and drainage district rates;
(c) Any public highway or right-of-way or other public easement, howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any decrees, orders or executions against or affecting the interest of the owner of the land which have been registered and maintained in force against the owner;
(f) Any right of expropriation which may be vested in any person, body corporate, or His Majesty;
(g) Any right-of-way or other easement granted or acquired under the provisions of any Act or law in force in the Province

161

GOVERNMENT OF THE PROVINCE OF ALBERTA

BH

161

Issued on instrument registered at 11.09 o'clock
A.M. on the 10 day of JULY
A.D. 1945
Number 8959 Book F. L. Folio 251
W. FORBES
Registrar S.A.L.R.D.

Certificate of Title

Assce. Fund Value $4800.00
Unearned Ins. Value $3525.00

Refer Cert. No. 28.S.155

South Alberta Land Registration District

CANCELLED

This is to Certify that MARY JANE BENTZ OF OLDS IN THE PROVINCE OF ALBERTA (WIDOW) EXECUTRIX OF THE WILL OF JOSEPH C. BENTZ (DECEASED)

is now the owner of an estate in fee simple (AS TO THE INTEREST OF JOSEPH C. BENTZ UNDER CERTIFICATE OF TITLE 28.S.155 AS SUCH EXECUTRIX)

of and in THE WEST HALF OF SECTION TWO (2) IN TOWNSHIP THIRTY THREE (33) RANGE ONE (1) WEST OF THE FIFTH MERIDIAN IN THE PROVINCE OF ALBERTA CONTAINING THREE HUNDRED AND TWENTY (320) ACRES MORE OR LESS.

EXCEPTING OUT OF THE SOUTH WEST QUARTER FIFTY HUNDREDTHS (0.50) OF AN ACRE MORE OR LESS FOR A ROADWAY AS SHOWN ON A PLAN FILED IN THE LAND TITLES OFFICE FOR THE SOUTH ALBERTA LAND REGISTRATION DISTRICT AS 2360 E.Z.

RESERVING UNTO HIS MAJESTY ALL MINES AND MINERALS AND THE RIGHT TO WORK THE SAME, AND

This Certificate is cancelled and a new Certificate No. 66183 issued to MARY JANE BENTZ under Transfer to HER from the above number 14 July 1945 Fee Registration $2.00 1 day of August A.D. 1945 at 9 A.M. 98 H.F.L. [illegible] Registrar

NO ENDORSEMENTS ON BACK OF TITLE

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this TENTH day of JULY A.D. 1945

[signature] as Registrar
South Alberta Land Registration District

P.O. Address OLDS, ALBERTA

CANCELLED 28 S 155

CANADA

Issued on instrument registered at 10.34 o'clock a.m. on the 7 day of Sept A.D. 1932. Number 3747 Book D13 Folio 107
Jas E Richardson
Ex Registrar, S.A.L.R.D.

Abs.

Certificate of Title

14 D. 51
18 B. 11

Assce. Fund Value $ 1200.
Unearned Inc. Value $ 7050.

Refer Cert. No.

CANCELLED

South Alberta Land Registration District

This is to Certify that Joseph C Bentz of Olds in the Province of Alberta Farmer and Mary Jane Bentz of the same place his wife are now the owners of an estate in fee simple CANCELLED of and in the West half of Section Two (2) in Township Thirty Three (33) Range One (1) West of the Fifth Meridian in the Province of Alberta containing Three hundred and Twenty (320) acres more or less.

Reserving unto His Majesty all mines and minerals and

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this Seventh day of September A.D. 1932

Jas E Richardson a Registrar,
South Alberta Land Registration District.

P.O. Address Olds Alberta

Agricultural Relief Advances Act (1934) dated 10/6/37 No. 7822 FX.
reg'd 10 12 m 12 June 1937
Eleanora Snipes 6 mi N Mountain View 310 — 16 April 6 30 — 2 27 pm — 12 Apl 1938 — 15 JLEv

Mortgage Owners to Canadian Farm Loan Board $2800.00 @ 5%
12 Jan 1939 . 10 13 am - 28 Jan 1939 - 493 LW

Lot 4

This Certificate is cancelled as to 0.50 of an acre
Deed of Gift and Release and a new Certificate 56 W 128
Issued to U. S. The King
[illegible] under No. ——— Date 21 Mch 1942
and Registered at 1100 on 2 May 1962 as 2360 EZ.

J C Glendey AO Registrar

1/ Discharge of Mortgage 4793 E.Z. — 26 Oct. 1944 — 10.07 AM —
— 21 Nov. 1944 — 3027 FJ.

This Certificate is cancelled as to the Int. of Joseph C. Bantz.
and a new Certificate 66C/61 issued to
Mary Jane Bantz
Transfer to [illegible] from the
above named registered owner 6 July 1945.
and Registered at 11.09 o'clock A.M. this 10 day of
July A.D., 1945 as No. 29597 FJ.
C.F. Archer
as Registrar

Cancelled this 2 day of AUGUST
1945 by co[illegible] certificate
66E 183 under certificate. 66E185
C.F. Archer as Registrar

14 S. 57.

CANADA

Certificate of Title.

Issued on instrument registered at 2 22 o'clock p.m. on the 6 day of November A.D. 1916 Number 6610 Book 80 Folio 211.
E. Morrow
for Registrar A.L.R.D.

Assess. Land Value $ 5.00

Unearned Inc. Value Transaction

Land Registration District

Refer Cert. No. 9.E.63.

This is to Certify that The Trusts & Guarantee Company, Limited, Administrator, de bonis non, of the Estate of Emma Bell, late of Olds, in the Province of Alberta, married woman, deceased Emma Cole.

is now the owner of an estate in fee simple, as such Administrator, in the interest of said under Certificate of Title No. 9.E.110. being the undivided half share (7275 Ac.)

of and in the West half of Section Two (2) in Township Thirty-three (33) Range One (1), West of the Fifth Meridian in the Province of Alberta, containing Three hundred and twenty (320) acres, more or less.

Reserving unto His Majesty all mines and minerals and

This Certificate is cancelled
and a new Certificate 5155 issued to
Joseph C Busby et al
on the transfer to Rea from the
above named registered owner dated January 9th 1922
and registered at 10 o'clock A.M. this 7 day of
Sept A.D. 1922 as No. 8787 S.R.
Jos. E. Graham
Registrar

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof *I have hereunto subscribed my name and affixed my official seal this* Eighth
day of November *A.D.* 1916

E. Morrow as Registrar,
Land Registration District.

P.O. Address

CANCELLED

NO ENDORSEMENTS ON BACK OF TITLE

Implication and without any special mention therein, unless the contrary is expressly declared, be subject to—
(a) All subsisting reservations and exceptions contained in the original grant of the land from the Crown;
(b) All unpaid taxes;
(c) Any public highway or right-of-way or other public easement, however created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land thereunder;
(e) Any charge, lien or encumbrance against or affecting the interest of the owner of the land which have been registered under the provisions of any Act in force in the Province;
(f) Any right of expropriation which may be vested in any person, body corporate, or His Majesty;
(g) Any public highway or other easement granted or acquired under the provisions of any Act or law in force in the Province.

9563.

Certificate of Title.

CANADA

I Certify that the within Instrument is duly Entered and Registered in the Land Titles Office for the South Alberta Land Registration District at Calgary in the Province of Alberta, at 3 o'clock p. m., on the 22 day of September A.D. 1914 Number 9563 Book 3L Fol. 245

[illegible] Registrar A.L.R.D.

Refer Cert. No. J.L.113

Last Value $9600.

Transmission.

Land Registration District.

This is to Certify that Winfield Scott Call of Hde. in the Province of Alberta Farmer Administrator of the Estate of Emma Call late of the same place deceased.

is now the owner of an estate in fee simple as such Administrator in the Interest of Emma Call under Certificate of Title J.L.113.

of and in The West half of Section Two (2). in Township Thirty-three (33). Range Nine (9) West of the Fifth Meridian in the Province of Alberta, Containing Three hundred and Twenty (320) Acres, more or less.

Excepting thereout all Mines and Minerals and.

LAND TITLES ACT, Sec. 43.—The land mentioned in any certificate of title granted under this Act shall by implication and without any special mention therein, unless the contrary is expressly declared, be subject to—
(a) All unpaid taxes;
(b) Any subsisting reservations or exceptions contained in the original grant of the land from the Crown;
(c) Any public highway or right-of-way or other public easement, howsoever created upon, over or in respect of the land;
(d) Any subsisting lease or agreement for a lease for a period not exceeding three years, where there is actual occupation of the land under the same;
(e) Any subsisting right of any person other than the owner of the land which have been registered and maintained in force against the land under the provisions of any Act in force at the time of application for registration of the owner or evidence be vested in any person, body corporate, or the Province.
(f) Any right of way or other easement granted or acquired under the provisions of any Act or law in force in the Province.

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this Twenty-Second day of September A.D. 1914.

[illegible] Registrar,

Land Registration District.

P.O. Address Olds Alberta.

The title of the above owner is subject to a mortgage made by Duncan McIntyre to Donald McIntyre to secure $1696 and interest at 6 per annum payable as therein mentioned, dated 7th June 1914 and Registered at 10.45 A.M. on 4 June 1914 as 4644.

[illegible] Registrar.

4644 Transfer Donald McIntyre to Elizabeth Jane Marshall Home & James Home 2 34 11 24 Mar 17 1915 April 25 15 25 44 2 4 K. (Cancelled)

[illegible] Registrar.

The title of the above owner is subject to a mortgage made by Winfield A Scott Call & Emma Call to Wallace Craig Duncan & Charles Patton, to secure $ 250 and interest at 9 per annum payable as therein mentioned, dated 5 Jan 1911 and Registered at 10 a.m., the 11 of 1911 as 5260 A H.

R F Lum
Registrar

Mortgage 46444 discharged discharge
from Margaret Shaw

Dated the 28 April 1915
Registered at 10 a.m. the 15 day
of May 1915 as 2203 BL

R F Lum
Registrar

Mortgage 5260 A H discharged discharge
from Wallace Craig Duncan & Charles Patton

Dated the 10 August 1914
Registered at 11.28 a.m. 22 "
of May 1915 as 2368 BL

R F Lum
Registrar

Winfield Scott Call having died leaving property undermentioned
Letters of administration dated
13 Oct 1916
granted to The Trusts & Guarantee Co Ltd

This Certificate is cancelled
and a new Certificate No 2951 issued to
The Trusts & Guar Co Ltd
under Transfer to Transmission from the
above named registered owner dated 3 Nov 1916
and Registered at 2.30 o'clock P.M. this 8 day of
Nov. A.D., 1916 as No 6610

R F Lum
Registrar

J.L. 110

CANADA
8000

Certificate of Title.

I certify that the within is a true copy of the Certificate of Title duly entered and Registered in the Land Titles Office for the South Alberta Land Registration District as to the whole of the North West Quarter of Section Two (2) in Township Thirty three (33) Range One (1) West of the Fifth Meridian in the Province of Alberta, Containing one hundred and sixty (160) acres more or less, and as to the whole of the South West Quarter of Section Two (2) in Township Thirty three (33) Range One (1) West of the Fifth Meridian in the Province of Alberta, Containing one hundred and sixty (160) acres more or less, and as to the whole of the South East Quarter of Section Two (2) in Township Thirty three (33) Range One (1) West of the Fifth Meridian in the Province of Alberta, Containing one hundred and sixty (160) acres more or less, and as to the whole of the North East Quarter of Section Two (2) in Township Thirty three (33) Range One (1) West of the Fifth Meridian in the Province of Alberta, Containing one hundred and sixty (160) acres more or less, Reserving unto His Majesty His Successors and Assigns all mines and minerals and the right to work the same and subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

Dated at Ottawa this 1st day of April 1909

Frank Pedley
Deputy of the Minister of the Interior

CANCELLED

South Alberta Land Registration District

Reference Certificate D.L.240

This is to certify that Winfield S. Call of Olds in the Province of Alberta, Farmer, and Emma Call, his Wife

are now the owners of an estate in fee simple of and in the West half of Section Two (2) in Township Thirty three (33) Range One (1) West of the Fifth Meridian in the Province of Alberta Containing three hundred and twenty (320) acres more or less.

Reserving unto His Majesty His Successors and Assigns all mines and minerals and the right to work the same and.

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this First day of April A.D. 1909

Frank Pedley Registrar,

South Alberta Land Registration District.

P.O. Address Olds, Alberta

1.— The title of the above Owners is subject to a Mortgage made by Duncan Mc Intyre to Donald Mc Intyre to secure $1000— and interest at 6 % per annum payable as therein mentioned, dated 25th May 1904 and Registered at 10 min past 4 p.m. 4th June 1904 as 4044 J

Frank Pedley
Registrar

2.— Mortgage No. 4044 J is transferred by transfer from Donald Mc Intyre to Elizabeth Frame, Margaret Frame & James Frame. Dated the 22nd day of March 1905 Registered at 11.24 A.M. the 17th day of April 1905 as 4024 K

Frank Pedley
Registrar

3. The title of the above mentioned is subject to a Mortgage made by Joseph Marius Savoy to Honorable C. Fitzpatrick to secure $2870 and interest at 7% per annum payable as therein mentioned, dated 1st Feb 1906 and Registered at 10 a.m. 17th April 1906 as 356 N.

Registrar

Mortgage 356 N transferred by from Honorable C. Fitzpatrick to Oliver W. Chamberlain Dated the 24th day of June 1907 Registered at 10 a.m. the 5th day of August 1907 as 2113 BT.

Registrar

The title of the above mentioned is subject to a Mortgage made by him to Wallace Craig Duncan & Charles Patton to secure $500 and interest at 9 per annum payable as therein mentioned, dated 5 day 1911. and Registered at 10 a.m. 9 day 1911 as 5260 A.H.

Registrar

Mortgage 356 N is discharged by discharge from Oliver W. Chamberlain Dated the 21 day of April 1911 Registered at 9 25 a.m. the 15 day of Aug 1911 as 5544 A.H.

Registrar.

Lemuel Call died 8 April 1914

Letters of Administration dated 25 Aug 1914 Granted to Winfield Scott Call

This Certificate is cancelled and a new Certificate 96 63 issued to Winfield Scott Call under Transfer to Transmission from the above named registered owner dated 19 Sept. 1914. and Registered at 3 o'clock P.M. this 22 day of Sept. A.D. 1914 as No. 6142 BT.

Registrar.

Mortgage 4644 A is discharged by discharge from Margaret Fortune Dated the 28 day of April 1915 Registered at 10 a.m. the 15 day of May 1915 as 2203 BT.

Registrar.

Mortgage 5260 A is discharged by discharge from Wallace Craig Duncan & Charles Patton Dated the 10 day of August 1914 Registered at 11 28 a.m. 22 d of May 1915, as 2368 BT.

Registrar

Will of Winfield Scott Call dated 30 Sept 1914

Testator died 16 Apl 1916

Probate granted to

Earl Scott Call &

Elizabeth Horace Scott Starr.

This Certificate is cancelled and a new Certificate 71 issued to Earl Scott Call et al under Transfer to Transmission from the above named registered owner dated 10 Nov 1916 and Registered at 2 o'clock P.M. this 1 day of Dec A.D. 1916 as No. 2276

Registrar

CANADA

CANCELLED.

D.L. 240.

Duplicate Certificate of Title.

I certify that ... duly entered and reg... Titles Office for the So... Registration District at ... Province of Alberta at 10... o'clock A.M. on the 17 day of April A. D. 1906 Number 353 Book N Fol 15. [illegible] Registrar. L.A.L.R.C.

South Alberta Land Registration District

Reference to Register BZ. 164.

This is to Certify that Joseph Marion Silvey of Olds in the Province of Alberta Farmer

is now the owner of an estate in fee simple of and in the West half of section Two (2) in Township Thirty-three (33) Range One (1) West of the Fifth meridian in the said Province of Alberta containing Three hundred and Twenty (320) acres more or less.

Reserving unto His Majesty, his successors and Assigns all mines and minerals and the right to work the same, and

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this seventeenth day of April A.D. 1906.

W. Robertshaw Registrar

P. O. Address Olds Alberta.

South Alberta Land Registration District.

1. The Title of the above owner is subject to a Mortgage made by Duncan McIntyre & Donald McIntyre to secure $1596.00 and interest at 6 per cent per annum payable as therein mentioned dated 25th day May 1904 and registered at 10.44 a.m. 4th June 1904 as 4644 J. which Mortgage is transferred by Transfer from the said Donald McIntyre & Elizabeth Thorne Margaret Thorne and James Thorne dated 2nd March 1905 and registered at 11.24 a.m. 17th April 1905 as 4824 K.

W. Robertshaw Registrar

2. The Title of the above owner is subject to a Mortgage made by Levi L. Thomas to Mr. Kercher to secure $2870.00/100 and interest at 7 per cent per annum payable as therein mentioned dated 11th April 1906 and registered at 10.16 a.m. 17th April 1906 as 356.N.

H. Stuart Wintle Registrar

3.

Mortgage 356N; transferred by transfer from Thomas McKercher to Oliver W. Chamberlain

Dated the 24 day of June 1907

Registered at 10.23 a.M. the 5th day of August 1907 as 2113-R

H. Stuart Wintle Registrar

This Certificate is cancelled

and a new Certificate [illegible] issued to Winfred L. Hall and Emma Hall

[illegible] to them from the [illegible] dated 22 March 1906

at 10.50 o'clock A.M. this 12th day of April A.D., 1906 as [illegible]

Registrar

B.Z. 164.

Certificate of Title.

CANADA. TERRITORIES.

This Certificate is cancelled ..... and a new certificate of title No. D.L. 234 issued this 14th day of April A.D. 1906.

..... Registrar S.A.L.R.D.

See Reference Certificates { B.Z. 162. B.Z. 163.

I Certify that the within instrument is duly entered and registered in the Land Titles Office for the South Alberta Land Registration District of the North West Territories, at 10 o'clock a.m. on the 4th day of June A.D. 1904, number 4643 in Book 164 Folio. W. Roland Wicks Registrar S.A.L.R.D.

South Alberta Land Registration District.

This is to Certify that Duncan McIntyre of Olds in the District of Alberta in the North West Territories, Farmer

is now the owner of an estate in fee simple of and in the West half of Section Two (2) in Township Thirty three (33) Range One (1) West of the Fifth Meridian in the said District of Alberta, containing Three Hundred and twenty (320) acres more or less;

Reserving unto His Majesty, His Successors and assigns all mines and minerals and the right to work the same and

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this Fourth day of June A.D. 1904.

W. Roland Wicks Registrar,

South Alberta Land Registration District.

P.O. Address, Olds N.W.T.

1. The title of the above owner is subject to a Mortgage dated 25th May 1904 made by him to Donald McIntyre to secure $1696.00 and interest at 6 per cent per annum payable as therein mentioned; Registered at 10.44 a.m. 4th June 1904 as 4644. J. W. Roland Wicks Registrar

2. Mortgage 4644. J. is transferred by Transfer from Donald McIntyre to Elizabeth Shane, Margaret Shane, and James Shane, dated 2nd March 1905, and registered at 11.24 a.m. 14th April, 1905, as 4024. K. W. Roland Wicks Registrar

Transfer to ..... from the above named registered owner dated ..... and registered at ..... o'clock ..... as No. ..... A.D. 19..... Registrar

NO ENDORSEMENTS ON BACK OF TITLE

B.Z. 163

CANADA. TERRITORIES

Cancelled this 4th day June 1904 by consolidation with Original B.Z. 162 under certificate B.Z. 164

H Roland Wade Registrar

Certificate of Title.

I Certify that the within Instrument to duly entered Land Registered in the Land Titles Office for the South Alberta Land Registration District at Calgary in the North West Territories, at 11 o'clock a.m. on the 4th day of June A.D. 1904 Number 164 Book I Fol. 169. H Roland Wade Registrar

South Alberta Land Registration District

See Reference Certificate B.Z. 8.

This is to Certify that Duncan McIntyre of Olds in the District of Alberta in the North West Territories, Farmer

is now the owner of an estate in fee simple

of and in the North West quarter of Section Two (2) in Township Thirty-three (33) Range One (1) West of the Fifth Meridian in the said District of Alberta containing by admeasurement One hundred and sixty (160) acres more or less;

Reserving unto His Majesty, His Successors and assigns all mines and minerals and the right to work the same and

NO ENDORSEMENTS ON BACK OF TITLE

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this Fourth day of June A.D. 1904.

H Roland Wade Registrar,

South Alberta Land Registration District.

P. O. Address, Olds N.W.T.

B.T.8.

8

CANADA
TERRITORIES

Duplicate Certificate of Title

I Certify that the within Instrument is duly entered and Registered in the Land Titles Office for the South Alberta Land Registration District at Calgary in the North West Territories, at 10 o'clock A.M. on the 24th day of December A.D. 1902 Number 6758 Book 1 Fol. 177.

...Registrar
CALGARY

This Certificate is cancelled

and a new certificate of title No. 4642 J. issued this 4th day of June A.D. 1904.

M. Fleming
Registrar
K. A. L. D.

South Alberta Land Registration District

See Reference Certificate 4.168.

This is to Certify that Duncan McIntyre and Donald McIntyre, both of Olds in the District of Alberta in the North West Territories, Farmers

are now the owners of an estate in fee simple

of and in the North West quarter of Section Two (2) in Township Thirty three (33) Range One (1) West of the Fifth Meridian, in the said District of Alberta containing by admeasurement One hundred and sixty (160) acres more or less.

Reserving unto His Majesty His Successors and Assigns all mines and minerals and the right to work the same and

NO ENDORSEMENTS ON BACK OF TITLE

CANCELLED

subject to the encumbrances, liens and interests notified by memorandum underwritten or endorsed hereon, or which may hereafter be made in the register.

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this Twenty fourth day of December A.D. 1902

M. Fleming
Registrar,
South Alberta Land Registration District.

P. O. Address Olds N.W.T.

This Certificate is cancelled and a new Certificate B.T.8 issued to Duncan McIntyre under Transfer to Same from the above named registered owners dated 25th May 1904 and registered at 10 o'clock A.M. this 4th day of June A.D. 1904 as No. 4642 J.

M. Fleming
REGISTRAR.

This Certificate is cancelled and a new certificate of title issued this 10th day of December A.D. 1902
W. Roland White
Registrar S.A.L.R.D.

Y.168.

168

CANADA TERRITORIES.

Certificate of Title.

South Alberta Land Registration District

This is to Certify that William Cattinor Cornwall of Township Thirty-two Range One West of the Fifth Meridian in the Provisional District of Alberta, in the North West Territories in the Dominion of Canada Farmer is now the owner of an estate in fee simple

of and in the North West Quarter of section Two, in the Thirty-Third Township, in the First Range West of the Fifth Meridian, in the Provisional District of Alberta, in the North West Territories, in the Dominion of Canada Containing by admeasurement one hundred and sixty acres more or less reserving unto Her Majesty Her Successors and Assigns all mines and minerals which may be found to exist within, upon, or under such lands together with full power to work the same and for this purpose to enter upon and use and occupy the said Lands or so much thereof and to such an extent as may be necessary for the effectual working of the said minerals or the mines pits seams and veins containing the same

I Certify that the within Instrument is duly entered and Registered in the Land Titles Office for the South Alberta Land Registration District at Calgary in the North West Territories, at 2.45 O'clock P.M. on the 10th day of November A.D. 1896 as Number 249 Book 9 Fol. 79
T. Davis Registrar S.A.L.R.D.

subject to the encumbrances, liens and interests notified by memorial underwritten or endorsed hereon, or which may hereafter be made in the Register of Titles

In Witness Whereof I have hereunto subscribed my name and affixed my official seal this Tenth day of November A.D. 1896,

T. Davis Registrar,
South Alberta Land Registration District

P. O. Address, Calgary N.W.T.

DATE OF INSTRUMENT.	PARTIES TO INSTRUMENT.	NATURE OF PARTICULARS OF INSTRUMENT.	NUMBER IN DAY BOOK.
		Certificate is cancelled and a new Certificate 249.9 issued to Duncan McIntyre and Donald McIntyre under Transfer to them from the above named registered owner dated 10th December 1902 and registered at 10. O'clock a.M. this 14th day of December A.D. 1902 as No. 4788.1. W. Roland White REGISTRAR.	

P. O. Address, _____ _____ Registrar.

NO ENDORSEMENTS ON BACK OF TITLE

Alberta Safety Codes Authority

A Division of the Safety Codes Council

July 5, 2021

Ms. Natasha Pitt
Athena Environmental Consultants Ltd.
364 Spruce St
Springbrook AB T3S 0P1

EMAIL: npitt@athenaenv.ca

Re: ASCA Storage Tank Search - Your File No. 21-0018

Dear Ms. Pitt,

As per your search request dated June 28, 2021, Alberta Safety Codes Authority (ASCA) has searched the storage tank database for existing and former installations of storage tank systems, as defined by the Fire Code, including those known to be inside structures at the following address:

1. NW-2-33-1-4, AB

The search of the storage tank database determined no records were available for the address requested.

The Freedom of Information and Protection of Privacy Act governs the information provided. Please note that the database is ***not*** complete. The main limitation of the database is that it only includes information reported through registration and permitting or a survey of abandoned sites completed in 1992 and should not be considered a comprehensive inventory of all past or present storage tank sites. ASCA's storage tank systems database is solely maintained based on information provided by owners and or operators of storage tank systems; therefore, the database may not reflect information related to all existing or former storage tank systems in Alberta. Further information on storage tank systems or investigations involving a spill/release or contamination may be filed with the local fire service or Alberta Environment.

Regards,

ASCA Associate
ascatanks@safetycodes.ab.ca

Authorization Viewer **Traditional Agriculture Registration Viewer** **Public Notices Viewer** **Help**

Authorization Viewer - Search Results

The Search Used the Following Values:	
Legal Land Location:	NW 02-033-01-W5
Act / Document Type:	Water Act, EPEA
Show Inactive Authorizations:	Yes

The resulting Authorizations based on the search criteria will be displayed below. A will appear next to the Authorization when documentation is available for viewing or downloading. Please click Viewer Help if you encounter problems viewing the Authorization document.

0 Result(s)

Clear & Return

Comments regarding the Authorization Viewer page may be directed to the Regulatory Approvals Centre RAC.Environment@gov.ab.ca.

Facility Search Results

Data as of: September 13, 2018

Return to NPRI (National Pollutant Release Inventory) Data Search

Additional resources for accessing, understanding and analyzing NPRI (National Pollutant Release Inventory) data.
NPRI (National Pollutant Release Inventory) data is also available for download in ACCESS and EXCEL formats.

Search Information

Search criteria	
Reporting Year	2017
Substance	All Substances
Location	Postal code = T0M
Facility	All Facilities

Industrial Sectors	All Sectors
Type	All Types
Total Results	171

The number of results returned here may differ from published lists of the number of facilities reporting pollutant releases and transfers to the NPRI due to the inclusion of facilities reporting only under Ontario Regulation 127/01, and/or facilities submitting "did not meet criteria" reports.

Sort by:

Facility Name

Sort order:

Ascending

Sort

NPRI (National Pollutant Release Inventory) ID	GHGRP (Greenhouse Gas Reporting Program) ID	Facility	City	Province
19171		Aecon Transportation West - P-01	Beiseker Pit	AB
3941		AltaGas Ltd. - Harmattan - Harmattan Gas Processing Plant	Didsbury	AB
15437		ATCO Energy Solutions Ltd. - Carbon	Carbon	AB

29618		Bellatrix Exploration Ltd. - Willesden Green Comp Stn 05-03	Calgary	AB
22026		Bonavista Energy Corporation - AMOCO CAROLINE 15-16	SUNDRE NU	AB
27349		Bonavista Energy Corporation - BNP SUNDRE 08-01-034-06W5 GGS	SUNDRE NU	AB
23817		Bonavista Energy Corporation - BONAVISTA CARSTAIRS 3-3	CAR ELKTNU	AB
21078		Border Paving Ltd. - Portable Plant 020011	Lacombe	AB
24232		Border Paving Ltd. - Portable Plant 020010	Sandre	AB
18732		Canadian Natural Resources Limited - Green Oil Battery 07-06-039-05W5	n/a	AB
28314		Canadian Natural Resources Limited - Nevis Compressor Station 14-29-038-22W4	n/a	AB
29647		Canadian Natural Resources Limited - Clearwater Gas Battery 02-12-041-13W5	n/a	AB
24095		Canadian Natural Resources Limited - Ranger Rich Sweet Gas Plant 01-19-035-21W4	n/a	AB
22258		Canadian Natural Resources Limited - Wimborne Gas Battery 02-16-034-26W4	n/a	AB

16863		Canadian Natural Resources Limited - Tarragon Twinning North Sweet Gas Plant 04-31-032-24W4	n/a	AB
18874		Canadian Natural Resources Limited - Ghost Pine Sweet Gas Plant 04-18-032-22W4	n/a	AB
29258		Canadian Natural Resources Limited - Lanaway Oil Battery 04-23-036-03W5	n/a	AB
28663		Canlin Energy Corporation - Panther 10-13 Battery	na	AB
21753		Canlin Energy Corporation - Gilby 2-27 Gas Plant	na	AB
17600		Canlin Energy Corporation - PETRO-CAN GILBY	na	AB
22856		Canlin Energy Corporation - Nevis Battery 02-16	Nevis	AB
27469		Canlin Energy Corporation - Crossfield 5-22 Battery	na	AB
22891		Cargill Limited - Cargill AgHorizons, Equity HTP, AB	Trochu	AB
18636		Cenovus Energy Inc. - Gilby Comp Station 11-12	n/a	AB
18638		Cenovus Energy Inc. - Gilby Comp Station 07-08	n/a	AB

22221		Cenovus Energy Inc. - Gilby Comp Stn 14-17	n/a	AB
16238		Cenovus Energy Inc. - Medicine River Sour Gas Plant	n/a	AB
18670		Cenovus Energy Inc. - Medicine River Comp Stn 12-28	n/a	AB
22118		Cenovus Energy Inc. - Medicine River Comp Stn 02-10	n/a	AB
16258		Cenovus Energy Inc. - Sylvan Lake Oil Battery 10-21	n/a	AB
23408		Cenovus Energy Inc. - Gilby Gas Battery 08-16	n/a	AB
18701		Eagle Energy Inc. - Twinning Gas Plant	na	AB
18803		Ember Resources Inc. - Entice System 3 Comp Stn 16-28	N/A	AB
21029		Ember Resources Inc. - Lonepine West 02-29-031-28W4	Red Deer	AB
22289		Ember Resources Inc. - Entice Sweet Gas Plant 05-31	Calgary	AB
29013		Ember Resources Inc. - 06-02-34-25-W4M Linden	N/A	AB
29010		Ember Resources Inc. - Twining Sweet Gas Plant 12-10	N/A	AB

22307		Ember Resources Inc. - Elnora Gas Battery 15-32	N/A	AB
16591		Ember Resources Inc. - Entice System 2 Sweet Gas Plant 01-24	N/A	AB
16600		Ember Resources Inc. - Gayford South Comp Stn 12-35	N/A	AB
21456		Ember Resources Inc. - Three Hills Comp Stn 05-12	N/A	AB
18816		Ember Resources Inc. - 11-25-35-25-W4M Three Hills Comp Stn	N/A	AB
23547		Ember Resources Inc. - 14-35-29-24-W4M Swalwell Comp Stn	N/A	AB
18836		Ember Resources Inc. - Torrington Comp Stn 08-31	N/A	AB
19577		Ember Resources Inc. - Linden Comp Stn 07-11	N/A	AB
22907		Ember Resources Inc. - 13-27-31-25-W4M Keivers Lake Twining Gas Battery	N/A	AB
29014		Ember Resources Inc. - 13-15-36-24-W4M Ghost Pine Comp Stn	N/A	AB
21031		Ember Resources Inc. - Torrington 08-28-032-26W4	Red Deer	AB
29012		Ember Resources Inc. - 16-07-29-26-W4M Acme	N/A	AB

21028		Ember Resources Inc. - 09-14-030-27W4 Lonepine South	Red Deer	AB
24477		Ember Resources Inc. - 01-36-30-26-W4M Twining Comp Stn	N/A	AB
16126		Ember Resources Inc. - 01-22-27-25-W4M Entice Comp Stn	N/A	AB
16135		Ember Resources Inc. - 16-18-26-26-W4M Lyalta Comp Stn	N/A	AB
19550		Ember Resources Inc. - Entice System 2 Gas Battery 03-22	N/A	AB
21440		Ember Resources Inc. - Lousana Comp Stn 04-10	N/A	AB
23548		Ember Resources Inc. - Twining Comp Stn 01-11	na	AB
21422		Ember Resources Inc. - 05-19-31-22-W4M Ghost Hills Comp Stn	N/A	AB
16509		Encana Corporation - Severn Comp Stn 06-17	N/A	AB
16859		Encana Corporation - Carbon Sweet Gas Plant 08-34	N/A	AB
16711		Encana Corporation - Redland Comp Stn 11-19	N/A	AB
23543		Enmax Generation Portfolio Inc - Crossfield Energy Centre	Crossfield	AB

16924		ExxonMobil Canada Ltd - HARMELK 6-32	N/A	AB
28234		ExxonMobil Canada Ltd - Elkton Harmattan	Elkton	AB
6870		Foothills Pipe Lines Ltd. - Acme	na	AB
15417		Gain Energy Ltd. - Gilby Oil Battery 10-19-40-03W5M	Gilby	AB
15763		HARVEST OPERATIONS CORP. - ENCAL SYLVAN LAKE	na	AB
24497		HARVEST OPERATIONS CORP. - Harvest Crossfield 4-1-28-28w4	na	AB
22408		HARVEST OPERATIONS CORP. - REDLODGE 11-23 GGS	na	AB
24508		HARVEST OPERATIONS CORP. - CAROLINE 13-35	na	AB
24503		HARVEST OPERATIONS CORP. - Gilby Gas Plant 10-34	na	AB
16990		Husky Oil Operations Limited - Hastings Coulee Gas Plant 01-14-041-15W4	Forestburg	AB
17069		Husky Oil Operations Limited - Strachan Gas Plant 03-06-039-11W5	Nordegg	AB
16982		Husky Oil Operations Limited - Sylvan Lake Gas Plant 01-21-038-02W5	Sylvan Lake	AB

22505		Ikkuma Resources Corp. - Talisman 08-24	Calgary	AB
25200		Inplay Oil Corp. - Anderson 05-14-039-05W5	Anderson	AB
1364		Keyera Corp - Gilby Sour Gas Plant 15-22-040-03W5	n/a	AB
17167		Keyera Corp - Garrington Compressor Station 03-36-035-05W5	n/a	AB
4161		Keyera Corp - Ricinus Sweet Gas Plant 11-30-035-08W5	n/a	AB
28145		Long Run Exploration Ltd - LRE - Baytex 05-10	NA	AB
21806		Lynx Energy ULC - Twining Battery 09-33	Twining	AB
21802		Lynx Energy ULC - Penhold Central Battery 15-29	Penhold C	AB
22769		Lynx Energy ULC - Three Hills Creek Gas Battery 05-36	Calgary	AB
29760		Manitok Energy Inc. - Stolberg Comp Stn 06-21	NA	AB
29757		Manitok Energy Inc. - Stolberg Comp Stn 10-29	NA	AB
29759		Manitok Energy Inc. - Stolberg Comp Stn 15-1	NA	AB

29758		Manitok Energy Inc. - Stolberg Comp Stn 02-29	NA	AB
29446		Manitok Energy Inc. - Stolberg Comp Stn 13-15	N/A	AB
18902		NAL Resources Management - Sylvan 13-25-37-03-5	Sylvan	AB
23100		NAL Resources Management - Med River 06-34-39-03-5	Med River	AB
6559		NAL Resources Management - Sylvan Lake Gas Plant 14-32-037-03W5M	Sylvan Lake	AB
19014		NAL Resources Management - Med River 10-29-39-4	Med River	AB
21985		NAL Resources Management - Med River 06-20-38-04-5	Med River	AB
17239		NAL Resources Management - Medicine River 10-04-039-04-W5	Med River	AB
19016		NAL Resources Management - Sylvan Lake Gas Plant 06-08-38-03-5	Sylvan Lake	AB
18901		NAL Resources Management - Sylvan 07-13-37-03-5	Sylvan	AB
21722		NAL Resources Management - Olds 16-33-30-1W5	Calgary	AB
29524		NAL Resources Management - Med River 10-35-39-04-5	Med River	AB

19025		Newalta Corporation - Eckville	Eckville	AB
6560		Nexen Energy ULC. - Balzac Power Station	Rocky View County	AB
1902		Nexen Energy ULC. - Balzac Gas Plant	Rocky View County	AB
4144		Paramount Resources Ltd. - North Caroline Compressor Station	N/A	AB
4146		Paramount Resources Ltd. - South Caroline Compressor Station	N/A	AB
15339		Paramount Resources Ltd. - Lanaway Battery	N/A	AB
15538		Paramount Resources Ltd. - Lanaway 13-05-036-04W5	N/A	AB
15539		Paramount Resources Ltd. - East Garrington Plant	N/A	AB
15536		Paramount Resources Ltd. - Garrington 03-16-034-04W5	N/A	AB
15347		Paramount Resources Ltd. - Garrington Battery (13-05-034-03)	N/A	AB
15540		Paramount Resources Ltd. - Amoco Ricinus D Lease Battery	N/A	AB
1881		Parkland Refining Ltd. - Parkland Refinery	Bowden	AB
29569		Pembina Pipeline Corporation - Baptiste 08-19	Baptiste	AB

18999		Pine Cliff Energy Ltd. - CPC Trochu 16-32 GGS		AB
18625		Pine Cliff Energy Ltd. - Ghost Pine Comp Station 15-14-031-22W4		AB
18628		Pine Cliff Energy Ltd. - Ghost Pine No.1 Comp Station 06-05		AB
23412		Pine Cliff Energy Ltd. - Huxley Comp Station 08-32		AB
16237		Pine Cliff Energy Ltd. - Huxley Sweet Gas Plant 6-17		AB
21801		Pine Cliff Energy Ltd. - Huxley South 12-22		AB
23425		Pine Cliff Energy Ltd. - Twining Comp Stn 14-19		AB
29969		Pine Cliff Energy Ltd. - Greater Three Hills 04-29		AB
764		Plasti-Fab Ltd. - Plasti-Fab Polymer Plant & Plasti-Fab Crossfield	Crossfield	AB
11776		Premier Tech Home & Garden. - Balzac	Balzac	AB
24098		Ridgeback Resources Inc. - HARMATTAN ELKTON 6-29-30-4W5 OIL MWB	na	AB
21711		Sequoia Operating Corp. - Ghost Pine 9-24 GGS	Three Hills	AB

21734		Sequoia Operating Corp. - Twining 10-11 GGS	Three Hills	AB
21735		Sequoia Operating Corp. - Twining GP 4-33	Three Hills	AB
17877		SHELL CANADA LIMITED - Ram Compressor	Caroline	AB
17880		SHELL CANADA LIMITED - LS JCT 3 Compressor	Caroline	AB
2120		Shell Canada Limited - Caroline Complex	Caroline	AB
5288		SHELL CANADA LIMITED - Shantz Sulphur Forming Facility	Cremona	AB
21848		Signalta Resources Ltd. - Ascentex Joffre 11-29	Joffre	AB
24061		Sinopec Canada - Caroline Gas Battery 07-25	n/a	AB
28245		Sitka Exploration Ltd. - 13-24-037-05 W5M		AB
24347		Sitka Exploration Ltd. - 09-04-034-05 W5M Sundre Compressor		AB
26298		Sitka Exploration Ltd. - Sylvan Lake 5-19		AB
4827		Sundre Forest Products, A Division of West Fraser Mills Ltd. - Sundre Forest Products	Sundre	AB

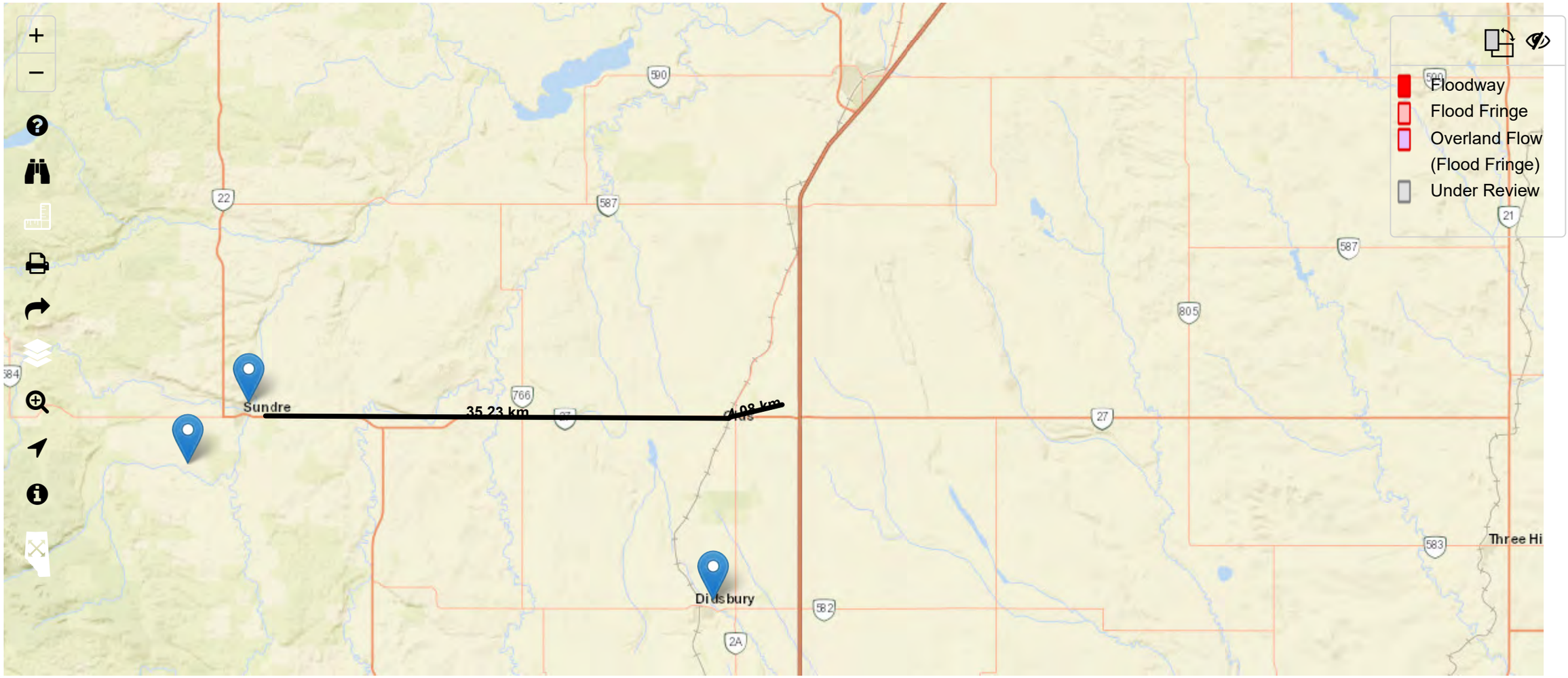
17741		TAQA North Ltd. - PRIMEWEST LONE PINE CREEK	LPC - CBM	AB
23220		TAQA North Ltd. - PEX CAROLINE 1-32	CAROLINE - WEST	AB
27673		TAQA North Ltd. - PCR FERRIER 7-16 COMP.	FERRIER - WEST	AB
22479		TAQA North Ltd. - BEARBERRY 07-09 GGS	Ricinus	AB
27665		TAQA North Ltd. - Find Pembina Blue Rapids GGB	PEMBINA	AB
4140		Taqa North Ltd. - East Crossfield Gas Plant 9-14-28-1W5	Crossfield	AB
15770		TAQA North Ltd. - PENHOLD (10-30)	PENHOLD	AB
23942		TAQA North Ltd. - NORTHRIDGE CAROLINE 3-26	CAROLINE - SOUTH	AB
17761		TAQA North Ltd. - CASCADE CAROLINE	Caroline - South	AB
18190		TAQA North Ltd. - SWALWELL 10-15 CBM BTY	SWALWELL	AB
23855		TAQA North Ltd. - Bearberry GP Multi Well Battery 5-31	Ricinus	AB
15198		Tidewater Midstream and Infrastructure Ltd. - Mikwan Sweet Gas Plant 05-22	N/A	AB

15201		Tidewater Midstream and Infrastructure Ltd. - Sylvan Lake Comp Stn 16-21	N/A	AB
6711		TransCanada PipeLines Ltd. - Clearwater	na	AB
6734		TransCanada PipeLines Ltd. - Schrader Creek	na	AB
6704		TransCanada PipeLines Ltd. - Beiseker	Beiseker	AB
6786		TransCanada PipeLines Ltd. - Vetchland	na	AB
23291		TransGlobe Energy Corporation - Harmattan Comp Stn 09-05	N/A	AB
16983		Trident Exploration Corp - Mikwan Gas Plant 05-19	n/a	AB
29745		Trident Exploration Corp - Trident Compressor Station 02-12	n/a	AB
19647		Trident Exploration Corp - Mikwan Gas Battery 06-03	n/a	AB
19643		Trident Exploration Corp - Trident Compressor Station 13-31	n/a	AB
29749		Trident Exploration Corp - Trident Compressor Station 01-32	n/a	AB
21896		Trident Exploration Corp - Ghost Pine Gas Battery 09-33	n/a	AB

17083		Trident Exploration Corp - Tarragon Sweet Gas Plant 13-27	n/a	AB
19638		Trident Exploration Corp - Dry Island Compressor Station 06-07-035-22W4	n/a	AB
19639		Trident Exploration Corp - Trident Compressor Station 13-14	n/a	AB
29753		Trident Exploration Corp - Trident Compressor Station 15-20	n/a	AB
18171		Vermilion Energy Inc. - Mikwan Gas Plant	Township 037	AB
19139		Viterra Inc. - Crossfield Viterra	Crossfield Market Centre	AB
19147		Viterra Inc. - Trochu Viterra	Crossfield Market Centre	AB
24201		Walmart Canada Logistics ULC - PDC6080	Rocky View	AB
29776		Westbrick Energy Ltd. - Willesden Green 08-10	Clearwater County	AB
29777		Westbrick Energy Ltd. - Westbrick 01-34	Clearwater County	AB
29365		Whitecap Resources Inc. - Garrington 2-4-35-4W5	na	AB
29156		Whitecap Resources Inc. - Whitecap Elnora 16-19-35-22W4	na	AB

24148		Whitecap Resources Inc. - Garrington 8-15-34-4W5	na	AB

Alberta Floods



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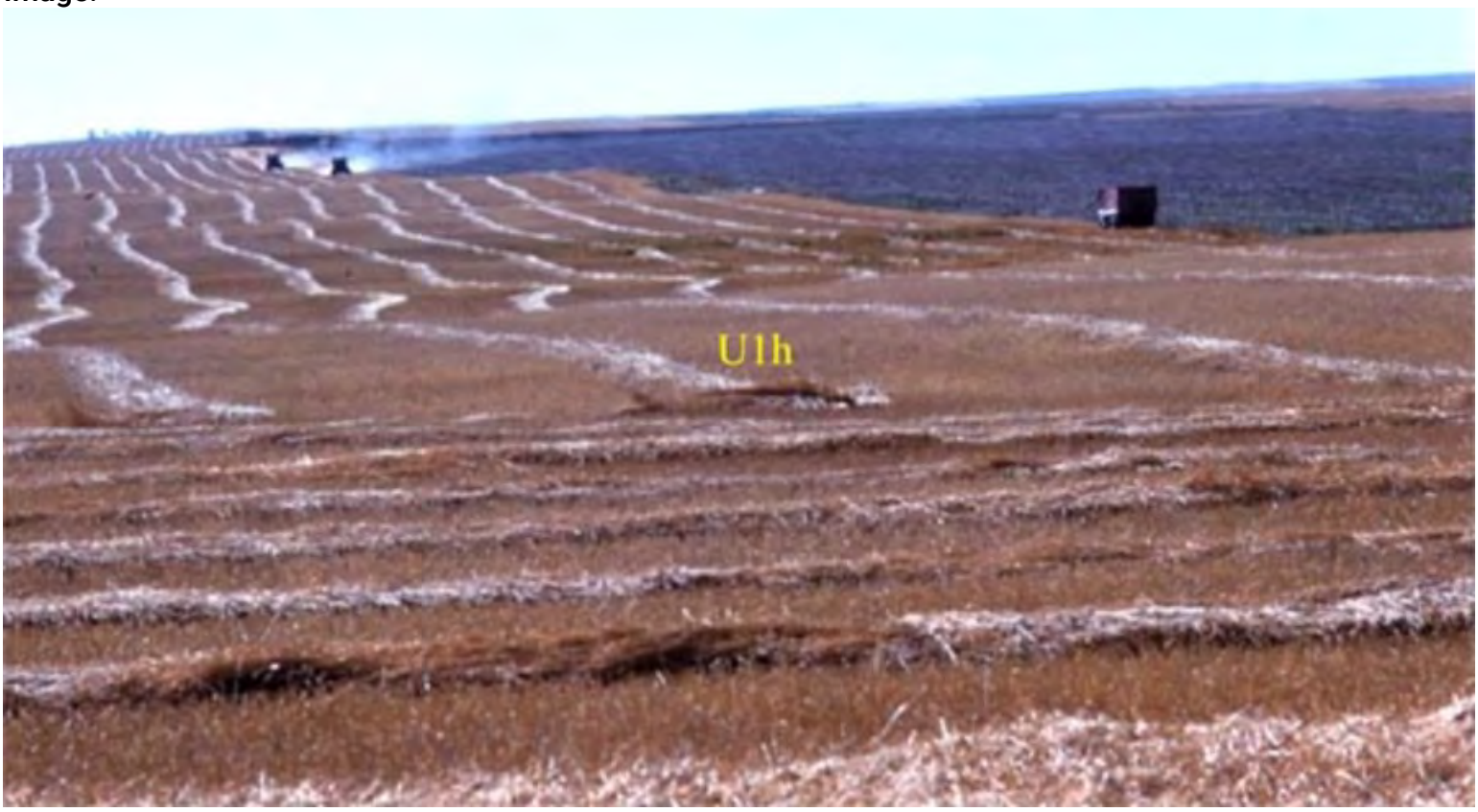
Leaflet (http://leafletjs.com) | Powered by Esri (https://www.esri.com) | Esr…

Report on Soil Polygon: 12956

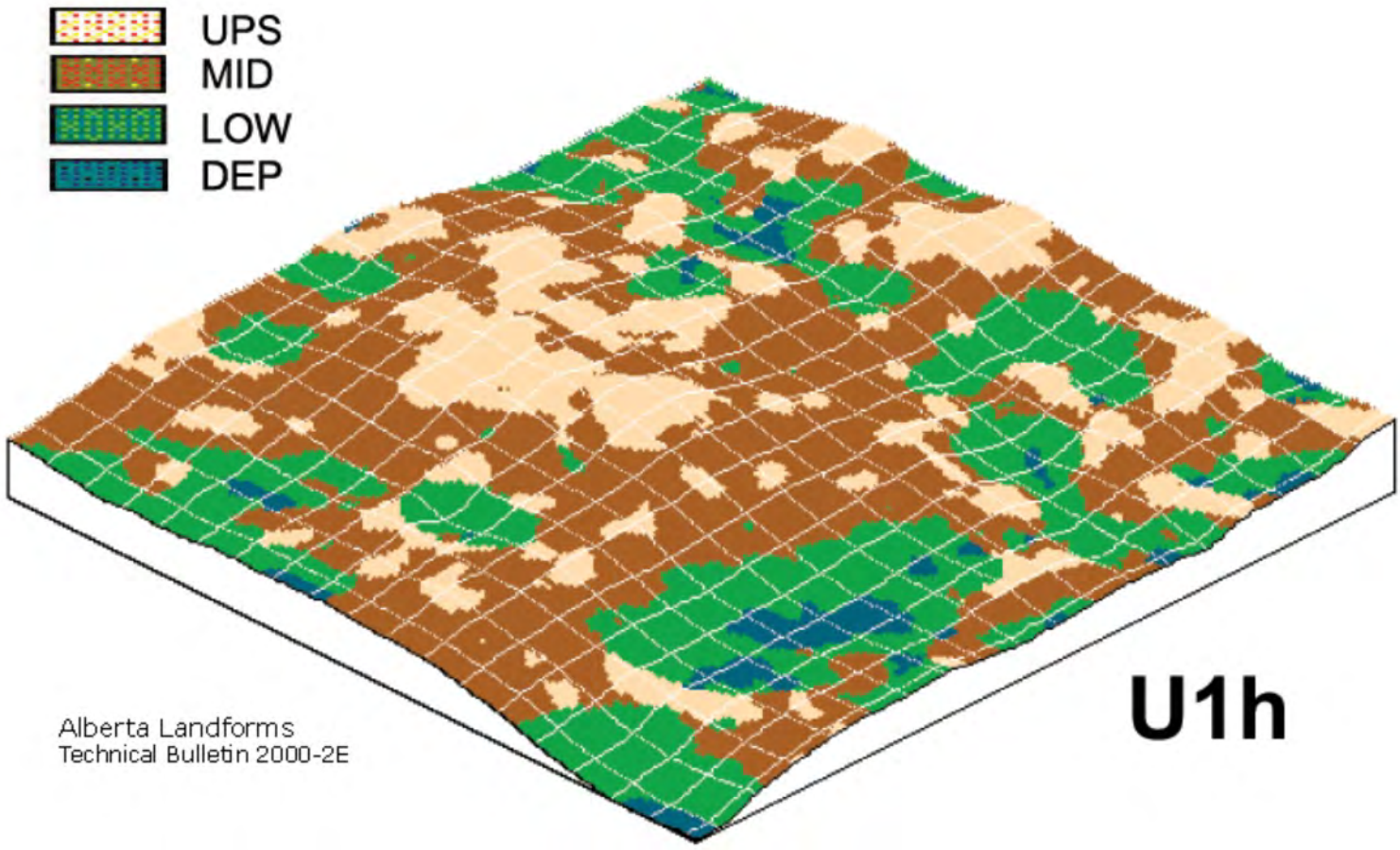
Variable	Value
POLY_ID	12956
Map Unit Name	ATL2/U1h
Landform	U1h - undulating - high relief
LSRS Rating (Spring Grains)	3H(8) - 5W(2)

Landscape Model Descriptions:
Orthic Black Chernozem on medium textured (L, CL) till (ATL).
The polygon includes poorly drained soils (2).
Undulating, high relief landform with a limiting slope of 4% (U1h).

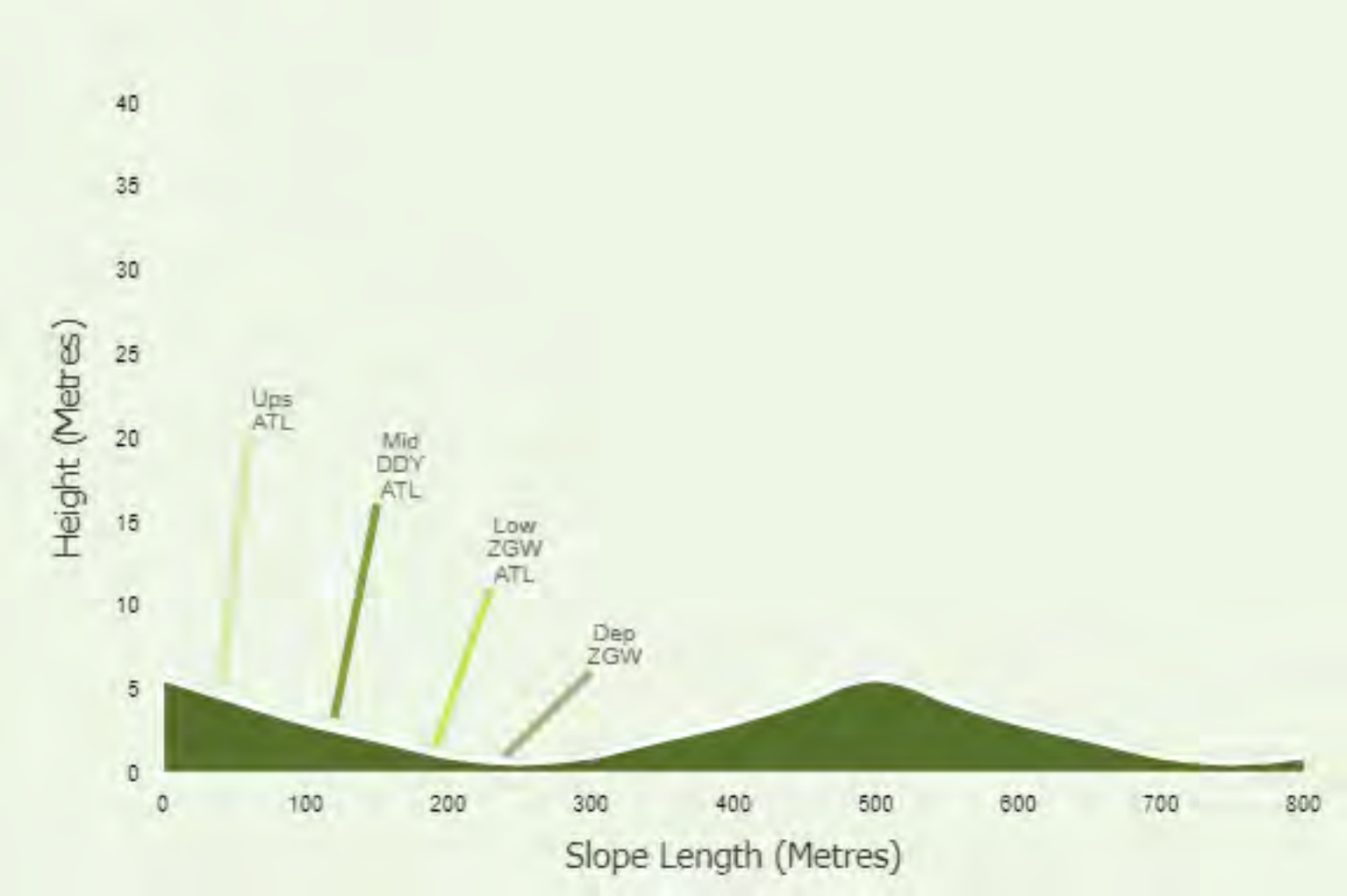
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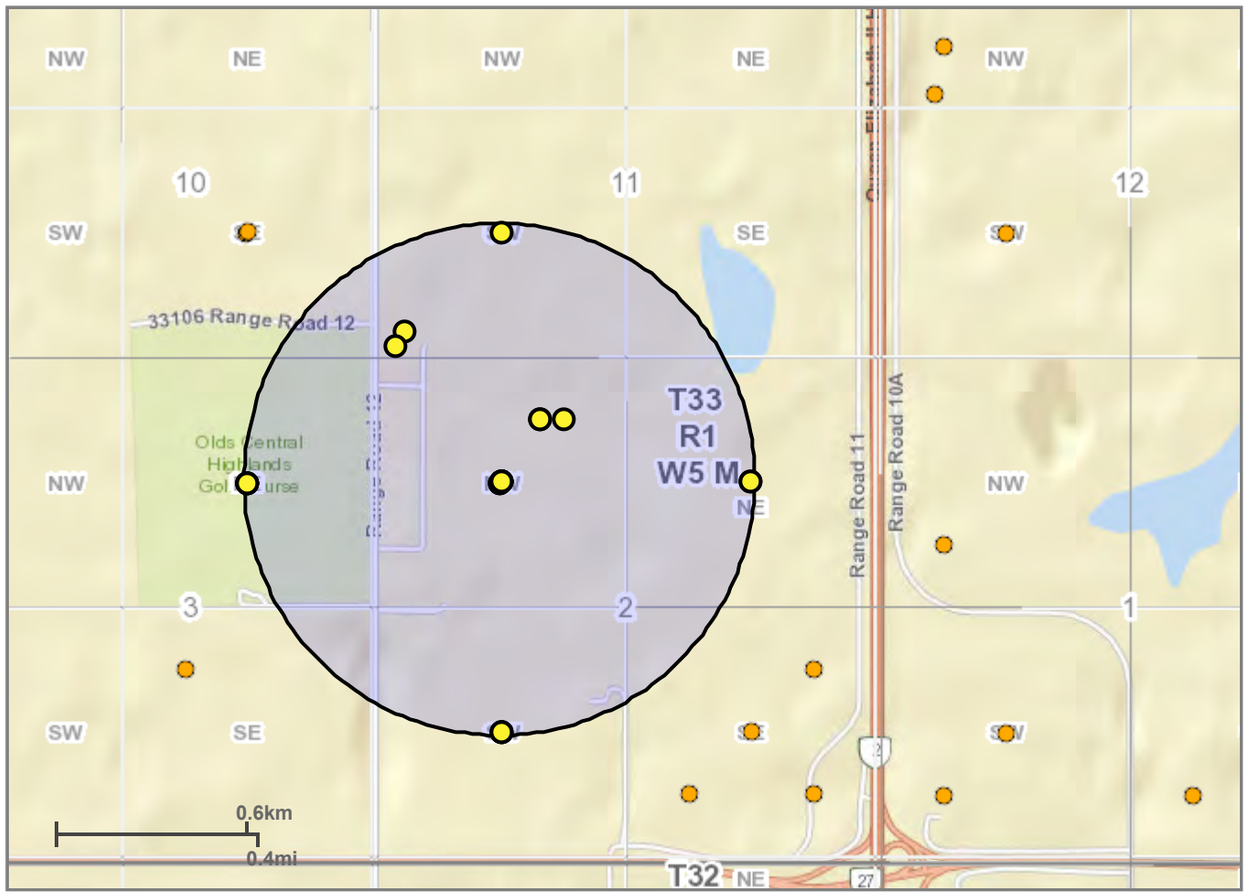


Landform Model:



Landform Profile:





Alberta Water Well Information Database Map

Projection
Web Mercator (Auxillary Sphere)

Datum
WGS 84

Date
8/10/2021, 11:23:20 PM

Legend
- Groundwater Drilling Report
- Baseline Water Well Report

http://groundwater.alberta.ca/WaterWells/d/

Information as depicted is subject to change, therefore the Government of Alberta assumes no responsibility for discrepancies at time of use.

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Reconnaissance Report

View in Imperial

Export to Excel

Groundwater Wells

Please click the water Well ID to generate the Water Well Drilling Report.

GIC Well ID	LSD	SEC	TWP	RGE	M	DRILLING COMPANY	DATE COMPLETED	DEPTH (m)	TYPE OF WORK	USE	CHM	LT	PT	WELL OWNER	STATIC LEVEL (m)	TEST RATE (L/min)	SC_DIA (cm)
341068	SW	11	33	1	5	M.E. LAWSON WATER WELLS	2001-11-21	28.96	New Well	Domestic		3	9	OLDS COUNTRY DEV LTD	6.40	68.19	14.12
341762	NW	2	33	1	5	KINSELLA DRILLING LTD.	2002-07-22	29.87	New Well	Domestic		4	20	COPPER CROWN HLDG	5.79	68.19	15.24
341763	NW	2	33	1	5	KINSELLA DRILLING LTD.	2001-10-04	28.04	New Well	Domestic		7	18	COPPER CROWN /SOWERBY, M.	6.28	54.55	15.24
359826	NE	3	33	1	5	DOERING DRILLING LTD.	1991-05-28	29.87	New Well	Domestic		12		OLDS GOLF COURSE	6.10	90.92	13.97
416133	SW	2	33	1	5	KINSELLA DRILLING LTD.	1974-04-09	33.53	New Well	Domestic		10		BURTON, W.M.	22.86	90.92	14.12
416134	NW	2	33	1	5	UNKNOWN DRILLER		24.38	Chemistry	Domestic	1			BURTON, W.M.			0.00
416135	14	2	33	1	5	HI-RATE DRILLING 1985 LTD.		195.07	New Well	Unknown		74			40.54	45.46	0.00
416136	NE	2	33	1	5	M.E. LAWSON WATER WELLS	1988-04-22	16.76	New Well	Domestic & Stock		2		MARTIN, JIM	6.40	136.38	13.97
416137	NE	2	33	1	5	DOERING DRILLING LTD.	1988-09-02	48.77	New Well	Domestic & Stock		15		MARTIN, JI,	6.46	54.55	13.97
416144	NE	3	33	1	5	DOERING DRILLING LTD.	1977-02-28	24.99	New Well	Domestic	2	7		OLDS MENS GOLF CLUB	6.49	90.92	14.12
469422	NW	2	33	1	5	KINSELLA DRILLING LTD.	1997-06-16	28.96	New Well	Domestic		5	11	COPPER CROWN HLDG #WELL 2	3.20	54.55	14.12
469423	NW	2	33	1	5	KINSELLA DRILLING LTD.	1997-06-19	30.48	New Well	Domestic		6	13	COPPER CROWN HLDG #WELL 3	2.32	54.55	14.12
469424	NW	2	33	1	5	KINSELLA DRILLING LTD.	1997-06-10	24.38	New Well	Domestic		5	9	COPPER CROWN HLDG #WELL 1	3.81	54.55	14.12
477136	SW	2	33	1	5	DOERING DRILLING LTD.	1988-01-18	43.28	New Well	Domestic & Stock		6		BURTON, B.	18.90	181.84	14.12
477137	SW	2	33	1	5	UNKNOWN DRILLER		42.67	Chemistry	Domestic				MCPHERSON, NANCY			0.00
497773	NE	3	33	1	5	DOERING DRILLING LTD.	2001-01-31	47.24	New Well	Other		8	23	OLDS GOLF CLUB ASSOC	21.64	36.37	13.97
497774	NE	3	33	1	5	DOERING DRILLING LTD.	2001-01-27	22.86	New Well	Other		11	23	OLDS GOLF CLUB ASSOC	2.68	46.82	13.97
499488	NW	2	33	1	5	KINSELLA DRILLING LTD.	2001-06-06	28.96	New Well	Domestic		3	5	COPPER CROWN HLDG	5.79	136.38	15.24
499489	NW	2	33	1	5	KINSELLA DRILLING LTD.	2001-06-20	28.04	New Well	Domestic		6	7	COPPER CROWN HLDG LTD	15.85	68.19	15.24
499490	NW	2	33	1	5	KINSELLA DRILLING LTD.	2001-06-05	27.43	New Well	Domestic		6	3	COPPER CROWN HLDG LTD	5.79	68.19	15.24

Reconnaissance Report

View in Imperial

Export to Excel

GIC Well ID	LSD	SEC	TWP	RGE	M	DRILLING COMPANY	DATE COMPLETED	DEPTH (m)	TYPE OF WORK	USE	CHM	LT	PT	WELL OWNER	STATIC LEVEL (m)	TEST RATE (L/min)	SC_DIA (cm)
1060896	14	2	33	1	5	ALKEN BASIN DRILLING LTD.	2004-05-03	24.38	New Well	Industrial		9	4	LEDGE / ENSIGN 49	3.05	318.23	14.13
1060896	14	2	33	1	5	ALKEN BASIN DRILLING LTD.			Existing Well-Decommissioned	Other				LEDGE / ENSIGN 49			
1480048	4	11	33	1	5	M.E. LAWSON WATER WELLS	2008-05-13	18.29	New Well	Domestic		4	3	O'ROURKE DEVELOPMENT	5.79	68.19	14.12
1480049	4	11	33	1	5	M.E. LAWSON WATER WELLS	2008-05-27	21.34	New Well	Domestic		2	3	O'ROURKE DEVELOPMENT	5.18	68.19	14.12

Alberta Merged Wetland Inventory



Legend

- ATS Section with Road Allowance Above Hydro
- ATS Quarter Section with Road Al Label Below Hydro
- ATS Legal SubDivision with Road Allowance Label Below Hydro
- ATS Township Index Outline 7
- ATS Section with Road Allowance
- ATS Quarter Section with Road Al Outline
- ATS Legal Subdivision with Road Allowance Outline
- ABWRET - Estimate of Relative W Value By Section Pie Chart - Visib Scale 27 084
- Estimated A-Value Hectares
- Estimated B-Value Hectares
- Estimated C-Value Hectares
- Estimated D-Value Hectares
- ABWRET - Estimate of Relative W Value By Section - Visible at Scale
- Alberta Merged Wetland Inventory
- Bog
- Fen
- Marsh
- Open Water
- Swamp

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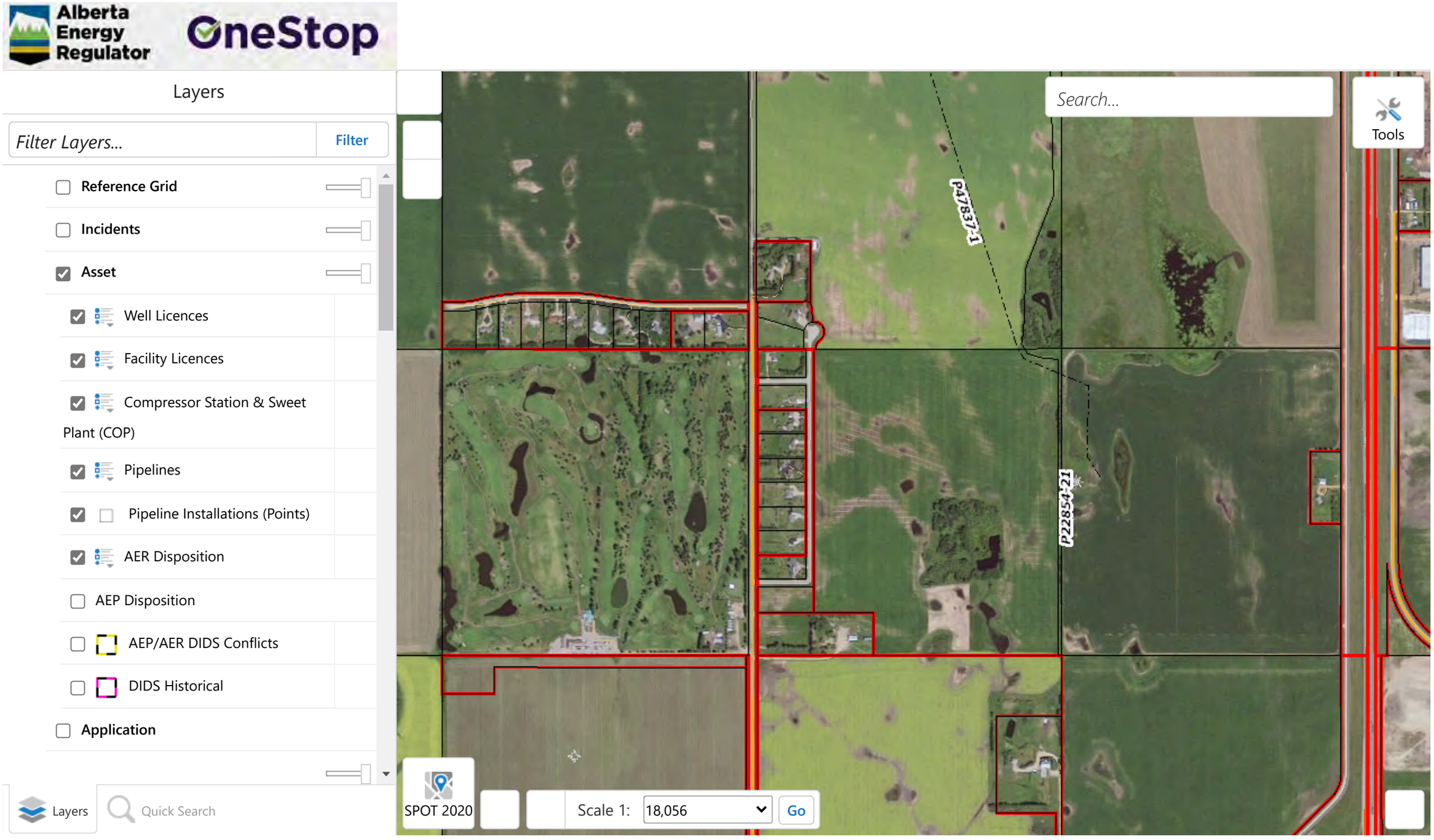
Monday, November 15, 2021 15:33:29 -07:00

0.9 0.46 0.9 Kilometers

0

Map Scale: 1: 18,056

Alberta Government
GeoDiscover Alberta


Alberta Energy Regulator
OneStop
Layers
Filter Layers...
Filter
Reference Grid
Incidents
Asset
Well Licences
Facility Licences
Compressor Station & Sweet Plant (COP)
Pipelines
Pipeline Installations (Points)
AER Disposition
AEP Disposition
AEP/AER DIDS Conflicts
DIDS Historical
Application
Search...
Tools
P47837-1
P22854-21
SPOT 2020
Scale 1: 18,056
Go
Layers
Quick Search



Abandoned Well Map

Base Data provided by: Government of Alberta

Author: Athena Environmental Consultants

Printing Date: 8/26/2021

Date Date (if applicable)

Legend

- Abandoned Well (Large Scale)
- Revised Well Location (Large Scale)
- Revised Location Pointer
- ATS LSD label
- ATS LSD with Road Allowance
- ATS Section label (large scale)
- ATS Section with Road Allowance
- ATS Township (large scale)
- Provincial Boundary

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Scale: 9,027.98

0.14 Kilometers 0

Projection and Datum:

WGS84 Web Mercator Auxiliary Sphere

Alberta Energy Regulator

APPENDIX G

ERIS Database Search

Bifröst

Environmental and Remediation Services Inc.

ERIS

DATABASE REPORT

Project Property:	*1273927 Alberta Ltd.* *SE-3-33-1W5M* *Olds AB*
Project No:	*2023061*
Report Type:	*Quote - Custom-Build Your Own Report*
Order No:	*23111700859*
Requested by:	*Bifröst Environmental and Remediation Services Inc.*
Date Completed:	*November 22, 2023*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

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Executive Summary

Property Information:

Project Property:	*1273927 Alberta Ltd.* *SE-3-33-1W5M Olds AB*
Project No:	*2023061*

Order Information:

Order No:	*23111700859*
Date Requested:	*November 17, 2023*
Requested by:	*Bifröst Environmental and Remediation Services Inc.*
Report Type:	*Quote - Custom-Build Your Own Report*

Historical/Products:

ERIS Xplorer	*ERIS Xplorer*
Physical Setting Report (PSR)	*Physical Setting Report (PSR)*

Executive Summary: Report Summary

Database	Name	Searched	Project Property	Boundary to 0.30km	Total
AERW	Well Licenses	Y	2	0	2
AGR	Agriculture and Fisheries - Certificates of Approval	Y	0	0	0
AOGW	Alberta Oil and Gas Wells	Y	0	0	0
AUTH	Authorizations	Y	0	0	0
AUWR	Automobile Wrecking & Supplies	Y	0	0	0
CAWD	Waste Management Facilities - Certificates of Approval	Y	0	0	0
CBL	Commercial Activity Risk - City of Calgary Business Licenses	Y	0	0	0
CDRY	Dry Cleaning Facilities	Y	0	0	0
CFO	Confined Feeding Operations	Y	0	0	0
CHEM	Chemical Processing Operations - Certificates of Approval	Y	0	0	0
CHM	Chemical Register	Y	0	0	0
CMPS	Compost Facilities	Y	0	0	0
CNG	Compressed Natural Gas Stations	Y	0	0	0
CONV	Compliance and Convictions	Y	0	0	0
CTNK	Fuel Sales and Storage	Y	0	0	0
DRWD	Approved Oilfield Waste Management Facilities	Y	0	0	0
EAS	Enforcement Action Summary	Y	0	0	0
EBL	Commercial Activity Risk - City of Edmonton Business Licenses	Y	0	0	0
ECMP	Environmental Compliance Prosecutions	Y	0	0	0
EEM	Environmental Effects Monitoring	Y	0	0	0
EHS	ERIS Historical Searches	Y	0	0	0
EIIS	Environmental Issues Inventory System	Y	0	0	0
EPST	Alberta Environment & Parks Storage Tanks	Y	0	0	0
EPWN	Environment Protection & Enhancement Act and Water Act Public Notices	Y	0	0	0
ESAR	Environmental Site Assessment Repository	Y	1	0	1
ETNK	Edmonton Vehicle Fueling Stations	Y	0	0	0
FAC	Facility List	Y	0	0	0
FCON	Federal Convictions	Y	0	0	0
FCS	Contaminated Sites on Federal Land	Y	0	0	0
FIS	AER Incidents & Spills	Y	0	0	0
FOOD	Food Processing Operations - Certificates of Approval	Y	0	0	0
FRST	Federal Identification Registry for Storage Tank Systems (FIRSTS)	Y	0	0	0
FST	Fuel Storage Tanks	Y	0	0	0
GEN	Waste Generators Summary	Y	0	0	0
GHG	Greenhouse Gas Emissions from Large Facilities	Y	0	0	0

Database	Name	Searched	Project Property	Boundary to 0.30km	Total
GPP	Gas Processing Plants	Y	0	0	0
HELP	Alberta Environment's H.E.L.P. (Help End Landfill Pollution) Program Database	Y	0	0	0
HORW	Horizontal Wells	Y	0	0	0
IAFT	Indian & Northern Affairs Fuel Tanks	Y	0	0	0
LDS	Identification and Verification of Active and Inactive Land Disposal Sites	Y	0	0	0
LDSI	Land Disposal Sites on Indian Reserves	Y	0	0	0
LNDF	Landfill Registrations	Y	0	0	0
LUM	Lumber Related Operations - Certificates of Approval	Y	0	0	0
MINE	Canadian Mine Locations	Y	0	0	0
MMB	Metals, Minerals and Building Materials Operations - Certificates of Approval	Y	0	0	0
MNR	Mineral Occurrences	Y	0	0	0
NATE	National Analysis of Trends in Emergencies System (NATES)	Y	0	0	0
NCST	PTMAA Non-Compliant Storage Tanks	Y	0	0	0
NDFT	National Defense & Canadian Forces Fuel Tanks	Y	0	0	0
NDSP	National Defense & Canadian Forces Spills	Y	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	Y	0	0	0
NEBI	National Energy Board Pipeline Incidents	Y	0	0	0
NEBP	National Energy Board Wells	Y	0	0	0
NEES	National Environmental Emergencies System (NEES)	Y	0	0	0
NPCB	National PCB Inventory	Y	0	0	0
NPR2	National Pollutant Release Inventory 1993-2020	Y	0	0	0
NPRI	National Pollutant Release Inventory - Historic	Y	0	0	0
OAM	Operating and Abandoned Mines	Y	0	0	0
OGF	Oil and Gas Facilities - ST102 & ST50	Y	0	0	0
OGWW	Oil and Gas Wells	Y	0	0	0
ORD	Enforcement Orders	Y	0	0	0
ORP	Alberta Orphan Wells	Y	0	0	0
PAP	Canadian Pulp and Paper	Y	0	0	0
PCFT	Parks Canada Fuel Storage Tanks	Y	0	0	0
PCG	Petrochemical, Coal and Gas Operations - Certificates of Approval	Y	0	0	0
PES	Pesticide Register	Y	0	0	0
PFCH	NPRI Reporters - PFAS Substances	Y	0	0	0
PFHA	Potential PFAS Handers from NPRI	Y	0	0	0
PITS	Conglomerate and Waste Management Facilities	Y	0	0	0
PSP	Alberta Private Sewage Disposal Permits	Y	1	2	3
PTAP	PTMAA Approved (Open) Permits	Y	0	0	0
REC	Hazardous Waste Receivers Summary	Y	0	0	0
RECY	Alberta Recyclers	Y	0	0	0
RST	Retail Fuel Storage Tanks	Y	0	0	0

Database	Name	Searched	Project Property	Boundary to 0.30km	Total
SCT	Scott's Manufacturing Directory	Y	0	0	0
SPEC	Special Operation Classifications - Certificates of Approval	Y	0	0	0
WDS	Inventory of Waste Disposal Sites	Y	0	0	0
WSTE	Wastewater Operations	Y	0	0	0
WWIS	Alberta Water Well Information Database	Y	2	2	4
	Total:		6	4	10

Executive Summary: Site Report Summary - Project Property

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev diff (m)	Page Number
1	AERW	MARATHON CDN-SUP OLDS 7-3-33-1	AB ***Unique Well ID:*** 00/07-03-033-01W5/0	NW/0.0	0.00	14
1	AERW	Repsol Oil & Gas Canada Inc. (0039)	AB	NW/0.0	0.00	14
2	WWIS		AB ***Well ID:*** 416138	WNW/0.0	0.00	15
2	WWIS		AB ***Well ID:*** 416139	WNW/0.0	0.00	17
3	ESAR	Reclamation	7-3-33-1-5 AB	WNW/0.0	0.00	21
4	PSP		[Q:NE S:3 T: 33 R:1 M:W5] MOUNTAIN VIEW COUNTY AB	ESE/0.0	0.00	21

Executive Summary: Site Report Summary - Surrounding Properties

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
5	WWIS		AB ***Well ID:*** 409796	SSE/219.4	-2.00	21
6	WWIS		AB ***Well ID:*** 12043714	ENE/266.6	-1.00	28
7	PSP		NW Quarter of Section: 2 Township: 33 Range: 1 West of: 5 Mountain View , County AB	E/267.0	-3.00	31
7	PSP		NW Quarter of Section: 2 Township: 33 Range: 1 West of: 5 Mountain View , County AB	E/267.0	-3.00	31

Executive Summary: Summary By Data Source

AERW - Well Licenses

A search of the AERW database, dated Aug 31, 2023 has found that there are 2 AERW site(s) within approximately 0.30 kilometers of the project property.

Site	Address	Distance (m)	Map Key
MARATHON CDN-SUP OLDS 7-3-33-1	AB ***Unique Well ID:*** 00/07-03-033-01W5/0	0.0	1
Repsol Oil & Gas Canada Inc.(0039)	AB	0.0	1

ESAR - Environmental Site Assessment Repository

A search of the ESAR database, dated 1960-Jul 2023 has found that there are 1 ESAR site(s) within approximately 0.30 kilometers of the project property.

Site	Address	Distance (m)	Map Key
Reclamation	7-3-33-1-5 AB	0.0	3

PSP - Alberta Private Sewage Disposal Permits

A search of the PSP database, dated 2003-2013 has found that there are 3 PSP site(s) within approximately 0.30 kilometers of the project property.

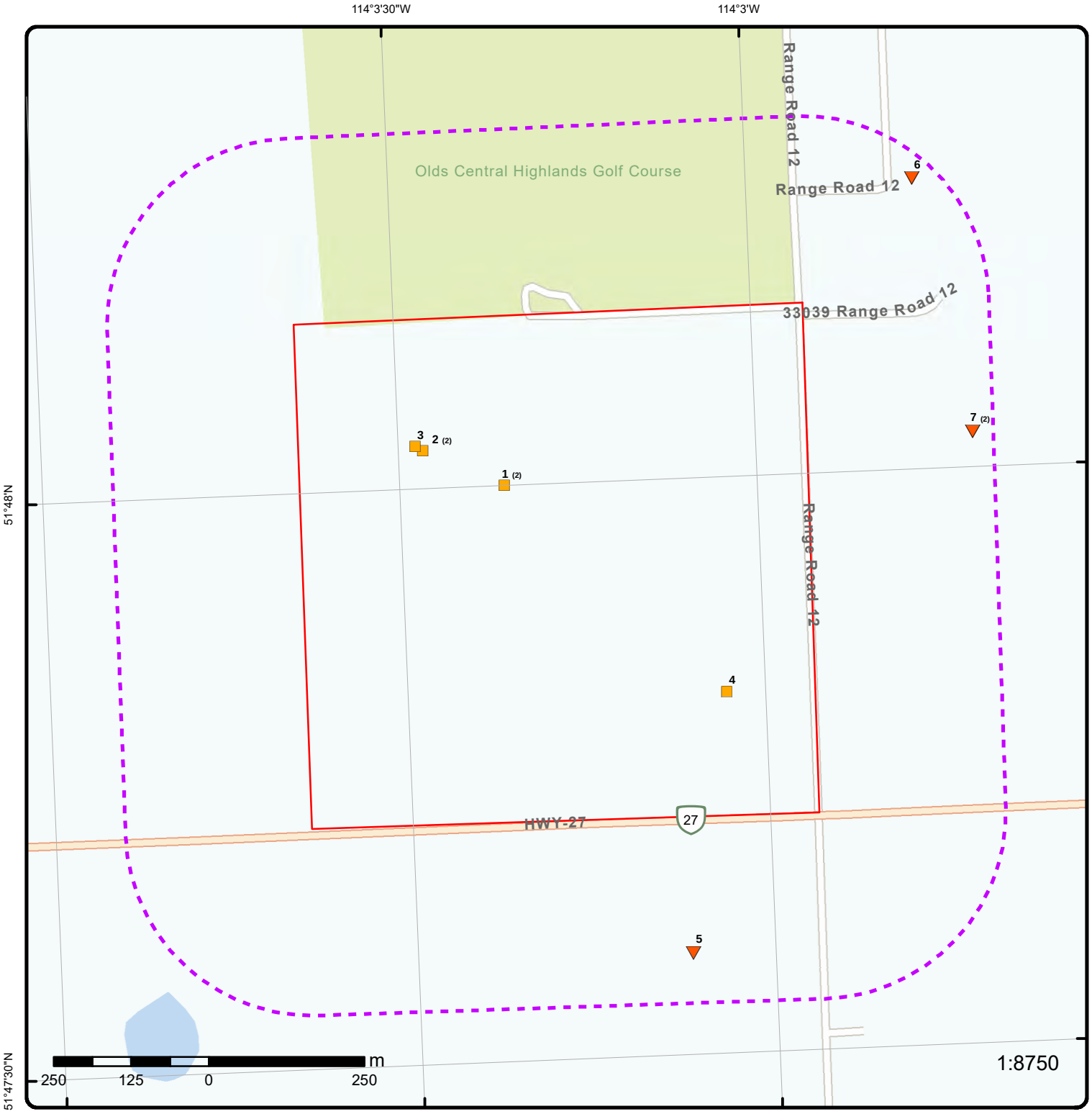
Site	Address	Distance (m)	Map Key
	[Q:NE S:3 T: 33 R:1 M:W5] MOUNTAIN VIEW COUNTY AB	0.0	4
	NW Quarter of Section: 2 Township: 33 Range: 1 West of: 5 Mountain View , County AB	267.0	7
	NW Quarter of Section: 2 Township: 33 Range: 1 West of: 5 Mountain View , County AB	267.0	7

Site	Address	Distance (m)	Map Key

WWIS - Alberta Water Well Information Database

A search of the WWIS database, dated 1880-Aug 31, 2023 has found that there are 4 WWIS site(s) within approximately 0.30 kilometers of the project property.

Site	Address	Distance (m)	Map Key
	AB ***Well ID:*** 416138	0.0	2
	AB ***Well ID:*** 416139	0.0	2
	AB ***Well ID:*** 409796	219.4	5
	AB ***Well ID:*** 12043714	266.6	6



Map: 0.3 Kilometer Radius

Order Number: 23111700859

Address: SE-3-33-1W5M, Olds, AB

- Project Property
- Buffer Outline
- Eris Sites with Higher Elevation
- Eris Sites with Same Elevation
- Eris Sites with Lower Elevation
- Eris Sites with Unknown Elevation
- Freeways; Highways
- Traffic Circle; Ramp
- Major Arterial; Minor Arterial
- Local Road
- Service Road; Traffic Circle; Ramp
- Rail
- Beach
- Airport
- Industrial Area
- Military Base
- Aircraft Roads
- Native Reservation
- Hospital
- Shopping & Sports Area
- University/College
- Cemetery; Golf Course
- Parkt (National)
- Park (City/County)

Source: © 2021 ESRI StreetMap Premium.

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Aerial

Year: 2022

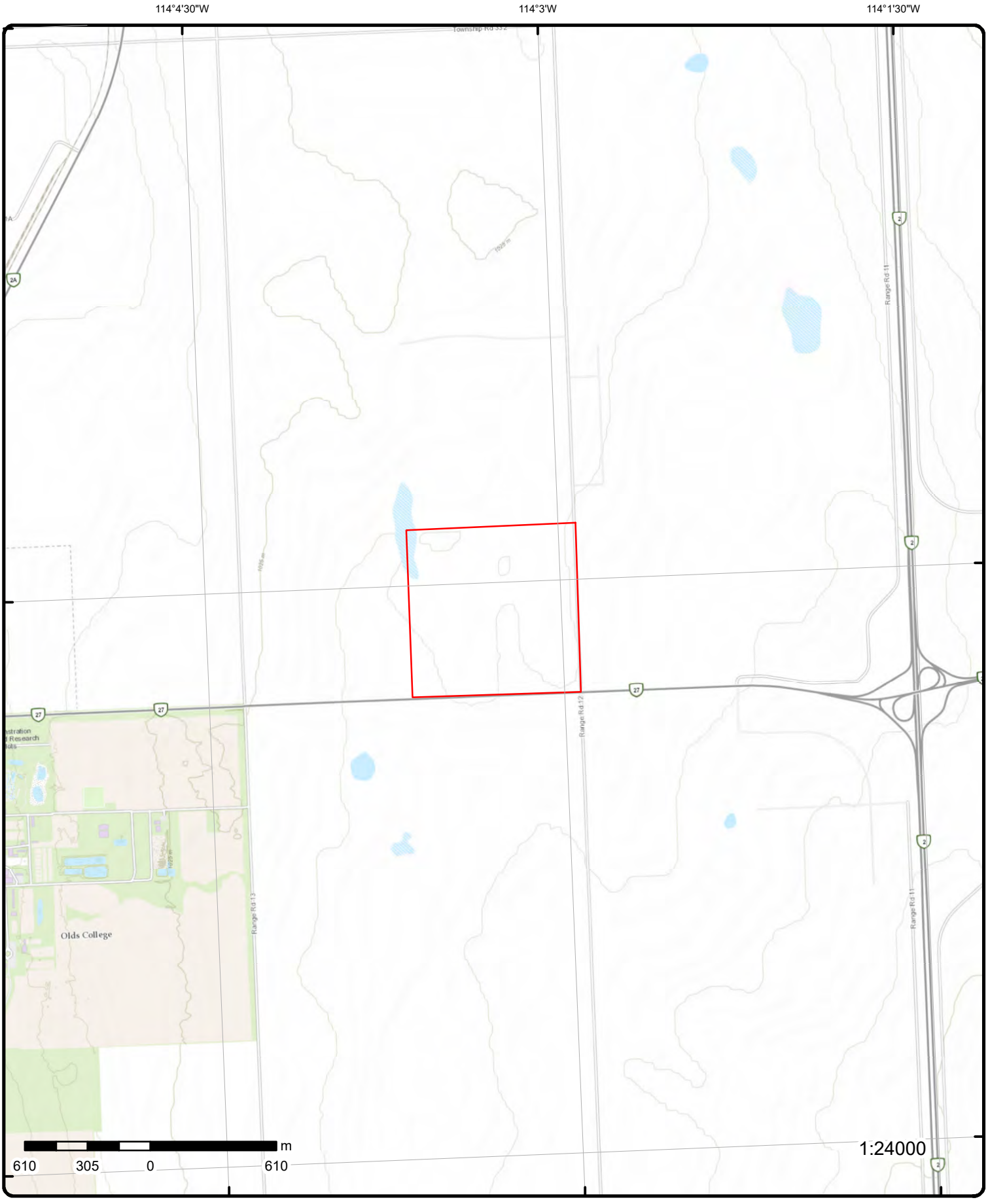
Address: SE-3-33-1W5M, Olds, AB

Source: ESRI World Imagery

Order Number: 23111700859

ERIS

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Topographic Map

Address: SE-3-33-1W5M, AB

Source: ESRI World Topographic Map

Order Number: 23111700859

ERIS

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Detail Report

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	1 of 2	NW/0.0	1,020.0 / 0.00	MARATHON CDN-SUP OLDS 7-3-33-1	AERW
				AB	

Unique Well ID:	00/07-03-033-01W5/0	**Agent:**	
Well Status:	0002000000	**Operator:**	
Keylist:	0335010307000	**Field:**	0405
License No:	0072245	**Pool:**	0000000
Licence Status:	RecCertified	**OS Area:**	
Licence Date:	1978-10-03	**OS Dep:**	0000000
Stat Date:	1979-01-05	**Max True Vert Depth:**	0.0
Well Fluid:	N/A	**Ground Elevation:**	1018.8
Well Mode:	ABD	**Surf Loc:**	
Well Type:	N/A	**EDCT:**	
Well Structure:	N/A	**Rating Ev:**	
Scheme Type:		**Op Surv Prov:**	
Scheme Subt:		**FD Date:**	1978-12-29
Bttm/Surface Hole:	Bottom Holes	**Total Dep:**	2780.0
Fluid Short Desc:	Not Applicable	**KBE:**	
Mode Short Desc:	ABANDONED	**Latitude:**	51.8
Type Short Desc:	Not Applicable	**Longitude:**	-114.056
Update:			

Structure Short Description: Not Applicable
Licensee: Repsol Oil & Gas Canada Inc.

Kelly Bushing Elevation Detail (s) (KBE)

KBE: 1025.8

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	2 of 2	NW/0.0	1,020.0 / 0.00	Repsol Oil & Gas Canada Inc.(0039)	AERW
				AB	

Unique Well ID:		**Agent:**	
Well Status:		**Operator:**	
Keylist:		**Field:**	
License No:	0072245	**Pool:**	
Licence Status:	RecCertified	**OS Area:**	
Licence Date:	31 Dec 1998	**OS Dep:**	
Stat Date:		**Max True Vert Depth:**	
Well Fluid:		**Ground Elevation:**	1018.8
Well Mode:		**Surf Loc:**	07-03-033-01W5
Well Type:		**EDCT:**	BWL
Well Structure:		**Rating Ev:**	J
Scheme Type:		**Op Surv Prov:**	
Scheme Subt:		**FD Date:**	
Bttm/Surface Hole:	Surface Holes	**Total Dep:**	
Fluid Short Desc:		**KBE:**	
Mode Short Desc:		**Latitude:**	51.8
Type Short Desc:		**Longitude:**	-114.056
Update:			

Structure Short Description:
Licensee:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Kelly Bushing Elevation Detail (s) (KBE)

KBE: 1025.8

---

2 ***1 of 2*** ***WNW/0.0*** ***1,020.0 / 0.00*** ***AB*** ***WWIS***

Well ID:	416138	***Elevation Source:***	Estimated
Driller ID:	24254	***Method of Drilling:***	
Licence No:		***GPS Obtained:***	Not Verified
GIC Well ID:	416138	***Boundary From:***	
GOA Well Tag No:		***Distance North:***	
Elevation (ft):	3340.00000000	***Distance South:***	
Depth (ft):		***Distance East:***	
Date Completed:		***Distance West:***	
Proposed Use:		***Additional Desc:***	
Lot:		***Validated?:***	TRUE
Block:		***Submitted?:***	TRUE
Plan:		***Location Locked?:***	TRUE
Type of Work:		***Longitude:***	-114.05786400
Flowing Well:		***Latitude:***	51.80054300
Date Started:		***LSD:***	7
Water Req Per Day:		***Section:***	3
Gas Present:		***Township:***	33
Oil Present:		***Range:***	1
Flow Rate:		***Meridian:***	5
Drilling Company:		***DLS Coordinates:***	7-3-33-1-5
Owner Mailing Address:			
Driller Mailing Address:			

Well Reports

Well Report ID:	416138	***Annular Seal Mat:***	Formation Packer
Well Owner ID:	10685845	***Annular Seal from:***	0.00
Driller ID:	2533726	***Annular Seal to:***	120.00
Drill Company ID:	24254	***Annular Seal Amt:***	
Drill Instance ID:	8335154	***Annular Seal Units:***	
Drill Comp Well ID:		***Drilling Method:***	Rotary
Existing Well ID:		***Drilling Start Dt:***	1978/11/13
Date Received:	1978/12/11	***Drilling End Dt:***	1978/11/13
Type of Work:	New Well	***Pack Type:***	
Plug Date:		***Pack Grain Size:***	
Plug Material Type:		***Pack Amount:***	
Plug Mat Amount:		***Pack Units:***	
Plugged Units:		***Loc Verify Method:***	Not Verified
Well Use:	Industrial	***Dist Casing Ground:***	
Other Well Use:		***Artesian Flow?:***	FALSE
Total Depth Drill:	142.00	***Artesian Flow Rate:***	
Finish Well Depth:		***Gas Depth:***	
Casing Material:	Steel	***Encounter Gas?:***	FALSE
Casing OD:	4.50	***Flow Ctrl Install?:***	FALSE
Casing Thickness:	0.00	***Recommended Rate:***	0.00
Casing Bottom:	142.00	***Recom Intake Depth:***	0.00
Liner Material:		***Pump Installed?:***	TRUE
Liner OD:	0.00	***Pump Install Depth:***	
Liner Thickness:	0.00	***Pump Model:***	
Liner Top:	0.00	***Pump Horsepower:***	3
Liner Bottom:	0.00	***Well Disinfected?:***	FALSE
Perforation by:		***Other Log:***	
Screen Material:		***Divert Water Src:***	
Screen Size OD:	0.00	***Divert Water Amt:***	

Screen Attachment:		***Diversion Dt/Time:***	
Screen Top Fitting:		***Is Submitted?:***	TRUE
Screen Bot Fitting:		***Is Validated?:***	TRUE
Encounter Saline Water?:	FALSE		
Saline Water Depth:			
Potability Sample Taken?:	FALSE		
Potable Sample Sent to AENV?:	FALSE		
Approval Holder Sign Date:			
Drilling Report Given to Owner:	FALSE		
Model Output Rating:			
Remedial Action:			
Flow Control Description:			
Pump Type Installed:	SUB		
Created by:			
Submitted by:			
Additional Comments:	DRILLER STATES WATER IS SOFT.		

Well Owners

Well Owner ID:	10685845
Owner Name:	CANADIAN SUPERIOR
PO Box:	
Address:	
City:	
Postal Code:	
Province:	
Country:	

Drillers

Driller ID:	2533726
Last Name:	DRILLER
Middle Initial:	NA
First Name:	UNKNOWN
Journeyman No:	1
Is Active?:	TRUE

Drilling Companies

Starting Well ID:	2059200
Ending Well ID:	2059299
Last Well ID Used:	2059205
Company Name:	ALL RITE DRILLING LTD.
Street Address:	7819 - 50 AVENUE
City:	RED DEER
Province:	AB
Country:	AB
Postal Code:	
E-Mail:	gwinfo@gov.ab.ca
Is Active?:	TRUE

Geophysical Logs

Geophysical Log ID:	5921481
Log Type:	Gamma
Log Taken?:	FALSE
Sent to AENV?:	FALSE

Geophysical Logs

Geophysical Log ID:	5518406
Log Type:	Electric

Log Taken?: FALSE
Sent to AENV?: FALSE

Boreholes

Borehole ID: 621294
Diameter: 0.000000
From: 0.000000
To: 142.000000

Lithologies

Depth: 80.000000
Water Bearing: FALSE
Colour:
Description:
Material: Clay

Lithologies

Depth: 135.000000
Water Bearing: FALSE
Colour:
Description:
Material: Coal

Lithologies

Depth: 130.000000
Water Bearing: FALSE
Colour:
Description:
Material: Shale

Lithologies

Depth: 142.000000
Water Bearing: FALSE
Colour:
Description:
Material: Shale

Pump Tests

Pump Test ID: 10348602
Test Date: 1978/11/13
Start Time: 1900/01/12
Taken from Top of Casing: FALSE
Static Water Level: 90.00
End Water Level:
Water Removal Type: Pump
Water Removal Rate: 20.00
Removal Depth from: 0.00
Reason for Short Test:

2	*2 of 2*	*WNW/0.0*	*1,020.0 / 0.00*	*AB*	*WWIS*

Well ID: 416139
Driller ID: 24254
Elevation Source: Estimated
Method of Drilling:

Licence No:		**GPS Obtained:**	Not Verified
GIC Well ID:	416139	**Boundary From:**	
GOA Well Tag No:		**Distance North:**	
Elevation (ft):	3335.00000000	**Distance South:**	
Depth (ft):		**Distance East:**	
Date Completed:		**Distance West:**	
Proposed Use:		**Additional Desc:**	
Lot:		**Validated?:**	TRUE
Block:		**Submitted?:**	TRUE
Plan:		**Location Locked?:**	TRUE
Type of Work:		**Longitude:**	-114.05786400
Flowing Well:		**Latitude:**	51.80054300
Date Started:		**LSD:**	7
Water Req Per Day:		**Section:**	3
Gas Present:		**Township:**	33
Oil Present:		**Range:**	1
Flow Rate:		**Meridian:**	5
Drilling Company:		**DLS Coordinates:**	7-3-33-1-5
Owner Mailing Address:			
Driller Mailing Address:			

Well Reports

Well Report ID:	416139	**Annular Seal Mat:**	Formation Packer
Well Owner ID:	10685846	**Annular Seal from:**	0.00
Driller ID:	2533726	**Annular Seal to:**	120.00
Drill Company ID:	24254	**Annular Seal Amt:**	
Drill Instance ID:	8335154	**Annular Seal Units:**	
Drill Comp Well ID:		**Drilling Method:**	Rotary
Existing Well ID:		**Drilling Start Dt:**	1978/11/14
Date Received:	1978/12/11	**Drilling End Dt:**	1978/11/14
Type of Work:	New Well-Decommissioned	**Pack Type:**	
Plug Date:	1978/12/14	**Pack Grain Size:**	
Plug Material Type:	Cement	**Pack Amount:**	
Plug Mat Amount:		**Pack Units:**	
Plugged Units:		**Loc Verify Method:**	Not Verified
Well Use:	Industrial	**Dist Casing Ground:**	
Other Well Use:		**Artesian Flow?:**	FALSE
Total Depth Drill:	142.00	**Artesian Flow Rate:**	
Finish Well Depth:		**Gas Depth:**	
Casing Material:		**Encounter Gas?:**	FALSE
Casing OD:	0.00	**Flow Ctrl Install?:**	FALSE
Casing Thickness:	0.00	**Recommended Rate:**	0.00
Casing Bottom:	0.00	**Recom Intake Depth:**	0.00
Liner Material:	Steel	**Pump Installed?:**	TRUE
Liner OD:	4.50	**Pump Install Depth:**	
Liner Thickness:	0.00	**Pump Model:**	
Liner Top:	0.00	**Pump Horsepower:**	3
Liner Bottom:	142.00	**Well Disinfected?:**	FALSE
Perforation by:	Torch	**Other Log:**	
Screen Material:		**Divert Water Src:**	
Screen Size OD:	0.00	**Divert Water Amt:**	
Screen Attachment:		**Diversion Dt/Time:**	
Screen Top Fitting:		**Is Submitted?:**	TRUE
Screen Bot Fitting:		**Is Validated?:**	TRUE

Encounter Saline Water?:	FALSE
Saline Water Depth:	
Potability Sample Taken?:	FALSE
Potable Sample Sent to AENV?:	FALSE
Approval Holder Sign Date:	
Drilling Report Given to Owner:	FALSE
Model Output Rating:	
Remedial Action:	
Flow Control Description:	
Pump Type Installed:	SUB

Created by:
Submitted by:
Additional Comments: DRILLER STATES WATER IS SOFT.

Well Owners

Well Owner ID: 10685846
Owner Name: CANADIAN SUPERIOR
PO Box:
Address:
City:
Postal Code:
Province:
Country:

Drillers

Driller ID: 2533726
Last Name: DRILLER
Middle Initial: NA
First Name: UNKNOWN
Journeyman No: 1
Is Active?: TRUE

Drilling Companies

Starting Well ID: 2059200
Ending Well ID: 2059299
Last Well ID Used: 2059205
Company Name: ALL RITE DRILLING LTD.
Street Address: 7819 - 50 AVENUE
City: RED DEER
Province: AB
Country: AB
Postal Code:
E-Mail: gwinfo@gov.ab.ca
Is Active?: TRUE

Perforations

Perforation ID: 4190363
From: 120.000000
To: 140.000000
Diameter: 0.000000
Interval: 0.000000

Geophysical Logs

Geophysical Log ID: 5921482
Log Type: Gamma
Log Taken?: FALSE
Sent to AENV?: FALSE

Geophysical Logs

Geophysical Log ID: 5518407
Log Type: Electric
Log Taken?: FALSE
Sent to AENV?: FALSE

Boreholes

Borehole ID: 621295
Diameter: 0.000000
From: 0.000000
To: 142.000000

Lithologies

Depth: 65.000000
Water Bearing: FALSE
Colour:
Description:
Material: Clay

Lithologies

Depth: 80.000000
Water Bearing: FALSE
Colour:
Description:
Material: Siltstone

Lithologies

Depth: 138.000000
Water Bearing: FALSE
Colour:
Description:
Material: Sandstone

Lithologies

Depth: 132.000000
Water Bearing: FALSE
Colour:
Description:
Material: Shale

Lithologies

Depth: 118.000000
Water Bearing: FALSE
Colour:
Description:
Material: Siltstone

Lithologies

Depth: 142.000000
Water Bearing: FALSE
Colour:
Description:
Material: Siltstone

Lithologies

Depth: 110.000000
Water Bearing: FALSE
Colour:

Description:
Material: Shale

Pump Tests

Pump Test ID: 10348603
Test Date: 1978/11/14
Start Time: 1900/01/12
Taken from Top of Casing: FALSE
Static Water Level: 80.00
End Water Level:
Water Removal Type: Pump
Water Removal Rate: 20.00
Removal Depth from: 0.00
Reason for Short Test:

---

3 | ***1 of 1*** | ***WNW/0.0*** | ***1,020.0 / 0.00*** | ***Reclamation 7-3-33-1-5 AB*** | ***ESAR***

ESA ID: 2305545
ESRD File: 00122969
File Classification: REC
Name: Reclamation
Operation Name: Reclamation
Map Link: https://www.esar.alberta.ca/esarmap.aspx?esaid=2305545
ESAR Link: http://www.esar.alberta.ca/esarmain.aspx?esaid=00122969
LLD: 5;1;33;3;SE;7
LINC:
A10tm Point Coordinates: 64926,5736985
10tm Point Coord: 64926,5736985
Extracted Dnld Dt: 2022-Jun-21

Document Detail

Doc Desc: Reclamation Certificate Documentation - MPCL CDN-SUP OLDS 7-3-33-1 WELL AND ACCESS ROAD
Doc Date: 8/31/1979

Document Detail

Doc Desc: Reclamation Application Documentation - MPCL CDN-SUP OLDS 7-3-33-1 WELL AND ACCESS ROAD
Doc Date: 5/31/1979

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4 | ***1 of 1*** | ***ESE/0.0*** | ***1,020.0 / 0.00*** | ***[Q:NE S:3 T: 33 R:1 M:W5] MOUNTAIN VIEW COUNTY AB*** | ***PSP***

Permit NO: 226IJD-08-S0081
Issue Date: 10/31/2008
Description:
DLS Coordinates: NE-3-33-1-W5
Municipality: MOUNTAIN VIEW COUNTY

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5 | ***1 of 1*** | ***SSE/219.4*** | ***1,018.0 / -2.00*** | ***AB*** | ***WWIS***

Well ID: 409796
Driller ID: 24288
Licence No:
GIC Well ID: 409796
GOA Well Tag No:
Elevation (ft): 3350.00000000
Depth (ft):
Date Completed:
Proposed Use:
Elevation Source: Estimated
Method of Drilling:
GPS Obtained: Map
Boundary From:
Distance North:
Distance South:
Distance East:
Distance West:
Additional Desc:

Lot:		***Validated?:***	TRUE
Block:		***Submitted?:***	TRUE
Plan:		***Location Locked?:***	TRUE
Type of Work:		***Longitude:***	-114.05203000
Flowing Well:		***Latitude:***	51.79313300
Date Started:		***LSD:***	16
Water Req Per Day:		***Section:***	34
Gas Present:		***Township:***	32
Oil Present:		***Range:***	1
Flow Rate:		***Meridian:***	5
Drilling Company:		***DLS Coordinates:***	16-34-32-1-5
Owner Mailing Address:			
Driller Mailing Address:			

Chemical Analysis

Chem Analysis ID:	2086207
Well Report ID:	409796
Sample No:	1809
Sample Date:	
Analysis Date:	1979/02/26
Laboratory:	AE
Water Level:	90.000000
Aquifer:	
Remarks:	

Analysis Items

Element Name:	Sulphate
Element Symbol:	SO4
Decimal Places:	4
Value:	1174.707820

Analysis Items

Element Name:	Total Hardness
Element Symbol:	TH
Decimal Places:	4
Value:	419.000000

Analysis Items

Element Name:	total Kjeldahl nitrogen
Element Symbol:	TKN
Decimal Places:	4
Value:	0.000000

Analysis Items

Element Name:	Calcium
Element Symbol:	CA
Decimal Places:	4
Value:	100.999596

Analysis Items

Element Name:	Potassium
Element Symbol:	K
Decimal Places:	4
Value:	5.116000

Analysis Items

Element Name: Hydroxide
Element Symbol: OH
Decimal Places: 4
Value: 0.000000

Analysis Items

Element Name: Electrical Conductivity
Element Symbol: EC
Decimal Places: 0
Value: 2980.000000

Analysis Items

Element Name: Magnesium
Element Symbol: MG
Decimal Places: 4
Value: 40.033152

Analysis Items

Element Name: Sodium
Element Symbol: NA
Decimal Places: 4
Value: 545.001100

Analysis Items

Element Name: Nitrite
Element Symbol: NO2
Decimal Places: 4
Value: -0.050400

Analysis Items

Element Name: Total Alkalinity
Element Symbol: TA
Decimal Places: 4
Value: 398.000000

Analysis Items

Element Name: Nitrate plus Nitrite
Element Symbol: NO2_NO3_N
Decimal Places: 4
Value: 0.459200

Analysis Items

Element Name: Total Phosphorus
Element Symbol: TP
Decimal Places: 4
Value: 0.000000

Analysis Items

Element Name: Ion Balance
Element Symbol: IONBAL
Decimal Places: 4
Value: 0.990000

Analysis Items

Element Name: Silica
Element Symbol: SIO2
Decimal Places: 4
Value: 6.400000

Analysis Items

Element Name: Chloride
Element Symbol: CL
Decimal Places: 4
Value: 4.004400

Analysis Items

Element Name: Iron
Element Symbol: FE
Decimal Places: 4
Value: 0.160000

Analysis Items

Element Name: Total Dissolved Solids
Element Symbol: TDS
Decimal Places: 0
Value: 2109.000000

Analysis Items

Element Name: Fluoride
Element Symbol: F
Decimal Places: 4
Value: 0.420000

Analysis Items

Element Name: pH
Element Symbol: PH
Decimal Places: 2
Value: 8.100000

Analysis Items

Element Name: Bicarbonate
Element Symbol: HCO3
Decimal Places: 4
Value: 485.046853

Well Reports

Well Report ID: 409796
Well Owner ID: 10688327
Driller ID: 2533726
Annular Seal Mat: Driven
Annular Seal from: 0.00
Annular Seal to: 39.00

Drill Company ID:	24288	***Annular Seal Amt:***	
Drill Instance ID:	8335238	***Annular Seal Units:***	
Drill Comp Well ID:		***Drilling Method:***	Combination
Existing Well ID:		***Drilling Start Dt:***	
Date Received:	1979/06/12	***Drilling End Dt:***	1978/12/12
Type of Work:	New Well	***Pack Type:***	
Plug Date:		***Pack Grain Size:***	
Plug Material Type:		***Pack Amount:***	
Plug Mat Amount:		***Pack Units:***	
Plugged Units:		***Loc Verify Method:***	Map
Well Use:	Domestic & Stock	***Dist Casing Ground:***	
Other Well Use:		***Artesian Flow?:***	FALSE
Total Depth Drill:	135.00	***Artesian Flow Rate:***	
Finish Well Depth:		***Gas Depth:***	
Casing Material:	Steel	***Encounter Gas?:***	FALSE
Casing OD:	5.56	***Flow Ctrl Install?:***	FALSE
Casing Thickness:	0.19	***Recommended Rate:***	0.00
Casing Bottom:	39.00	***Recom Intake Depth:***	125.00
Liner Material:	Steel	***Pump Installed?:***	FALSE
Liner OD:	4.56	***Pump Install Depth:***	
Liner Thickness:	0.14	***Pump Model:***	
Liner Top:	0.00	***Pump Horsepower:***	
Liner Bottom:	135.00	***Well Disinfected?:***	FALSE
Perforation by:	Torch	***Other Log:***	
Screen Material:		***Divert Water Src:***	
Screen Size OD:	0.00	***Divert Water Amt:***	
Screen Attachment:		***Diversion Dt/Time:***	
Screen Top Fitting:		***Is Submitted?:***	TRUE
Screen Bot Fitting:		***Is Validated?:***	TRUE

Encounter Saline Water?:	FALSE
Saline Water Depth:	
Potability Sample Taken?:	FALSE
Potable Sample Sent to AENV?:	FALSE
Approval Holder Sign Date:	
Drilling Report Given to Owner:	FALSE
Model Output Rating:	
Remedial Action:	
Flow Control Description:	
Pump Type Installed:	
Created by:	
Submitted by:	
Additional Comments:	

Well Owners

Well Owner ID:	10688327
Owner Name:	ALEXANDER, R.M./ JOYCE K.
PO Box:	699
Address:	OLDS
City:	
Postal Code:	T0M 1P0
Province:	
Country:	

Drillers

Driller ID:	2533726
Last Name:	DRILLER
Middle Initial:	NA
First Name:	UNKNOWN
Journeyman No:	1
Is Active?:	TRUE

Drilling Companies

Starting Well ID:	1245000
Ending Well ID:	1249999
Last Well ID Used:	1245342
Company Name:	DOERING DRILLING LTD.
Street Address:	BOX 4028
City:	OLDS
Province:	AB
Country:	CA
Postal Code:	T4H 1P6
E-Mail:	GWINFO@GOV.AB.CA
Is Active?:	FALSE

Perforations

Perforation ID:	4192466
From:	95.000000
To:	135.000000
Diameter:	0.125000
Interval:	6.000000

Geophysical Logs

Geophysical Log ID:	5927450
Log Type:	Gamma
Log Taken?:	FALSE
Sent to AENV?:	FALSE

Geophysical Logs

Geophysical Log ID:	5524375
Log Type:	Electric
Log Taken?:	FALSE
Sent to AENV?:	FALSE

Boreholes

Borehole ID:	626354
Diameter:	0.000000
From:	0.000000
To:	135.000000

Lithologies

Depth:	76.000000
Water Bearing:	FALSE
Colour:	Gray
Description:	
Material:	Till & Rocks

Lithologies

Depth:	116.000000
Water Bearing:	FALSE
Colour:	
Description:	Fine Grained
Material:	Sandstone

Lithologies

Depth: 96.000000
Water Bearing: FALSE
Colour:
Description: Fine Grained
Material: Sandstone

Lithologies

Depth: 109.000000
Water Bearing: FALSE
Colour: Black
Description: Carbonaceous
Material: Shale

Lithologies

Depth: 20.000000
Water Bearing: FALSE
Colour: Brown
Description:
Material: Till

Lithologies

Depth: 104.000000
Water Bearing: FALSE
Colour:
Description:
Material: Coal

Lithologies

Depth: 135.000000
Water Bearing: FALSE
Colour:
Description:
Material: Shale & Sandstone

Lithologies

Depth: 31.000000
Water Bearing: FALSE
Colour: Gray
Description: Sandy
Material: Till

Lithologies

Depth: 89.000000
Water Bearing: FALSE
Colour: Gray
Description:
Material: Shale

Lithologies

Depth: 102.000000
Water Bearing: FALSE
Colour: Gray

Description:
Material: Shale

Pump Tests

Pump Test ID: 10350290
Test Date: 1978/12/12
Start Time: 1900/01/12
Taken from Top of Casing: FALSE
Static Water Level: 0.00
End Water Level:
Water Removal Type: Bailer
Water Removal Rate: 15.00
Removal Depth from: 0.00
Reason for Short Test:

---

6 ***1 of 1*** ***ENE/266.6*** ***1,019.0 / -1.00*** ***AB*** ***WWIS***

Well ID: 12043714
Driller ID: 11547437
Licence No:
GIC Well ID: 2086519
GOA Well Tag No: A6592
Elevation (ft): 3355.00000000
Depth (ft):
Date Completed:
Proposed Use:
Lot:
Block:
Plan:
Type of Work:
Flowing Well:
Date Started:
Water Req Per Day:
Gas Present:
Oil Present:
Flow Rate:
Drilling Company:
Owner Mailing Address:
Driller Mailing Address:

Elevation Source: Hand held autonomous GPS 20-30m
Method of Drilling:
GPS Obtained: Hand held autonomous GPS 20-30m
Boundary From:
Distance North:
Distance South:
Distance East:
Distance West:
Additional Desc: SOUTH TEST WELL
Validated?: FALSE
Submitted?: FALSE
Location Locked?: FALSE
Longitude: -114.04621000
Latitude: 51.80420000
LSD: 12
Section: 2
Township: 33
Range: 1
Meridian: 5
DLS Coordinates: 12-2-33-1-5

Well Reports

Well Report ID: 12046392
Well Owner ID: 12047789
Driller ID: 11385995
Drill Company ID: 11547437
Drill Instance ID:
Drill Comp Well ID:
Existing Well ID:
Date Received: 2021/11/12
Type of Work: New Well
Plug Date:
Plug Material Type:
Plug Mat Amount:
Plugged Units:
Well Use: Domestic
Other Well Use:
Total Depth Drill: 200.00
Finish Well Depth: 200.00
Casing Material: Plastic
Casing OD: 6.00

Annular Seal Mat: Bentonite Chips
Annular Seal from: 0.00
Annular Seal to: 58.00
Annular Seal Amt: 450.00
Annular Seal Units: Pounds
Drilling Method: Rotary - Air
Drilling Start Dt: 2021/11/08
Drilling End Dt: 2021/11/08
Pack Type:
Pack Grain Size:
Pack Amount:
Pack Units:
Loc Verify Method:
Dist Casing Ground: 24.00
Artesian Flow?: FALSE
Artesian Flow Rate:
Gas Depth:
Encounter Gas?: FALSE
Flow Ctrl Install?: FALSE

Casing Thickness:	0.39	***Recommended Rate:***	15.00
Casing Bottom:	58.00	***Recom Intake Depth:***	60.00
Liner Material:	Plastic	***Pump Installed?:***	FALSE
Liner OD:	4.50	***Pump Install Depth:***	
Liner Thickness:	0.23	***Pump Model:***	
Liner Top:	40.00	***Pump Horsepower:***	
Liner Bottom:	100.00	***Well Disinfected?:***	TRUE
Perforation by:	Drill	***Other Log:***	
Screen Material:		***Divert Water Src:***	SHOP
Screen Size OD:		***Divert Water Amt:***	2000.00
Screen Attachment:		***Diversion Dt/Time:***	2021/11/08 08:00:00
Screen Top Fitting:		***Is Submitted?:***	TRUE
Screen Bot Fitting:		***Is Validated?:***	TRUE

Encounter Saline Water?: FALSE
Saline Water Depth:
Potability Sample Taken?: FALSE
Potable Sample Sent to AENV?: FALSE
Approval Holder Sign Date: 2021/11/08
Drilling Report Given to Owner: TRUE
Model Output Rating:
Remedial Action:
Flow Control Description:
Pump Type Installed:
Created by: 1D8AF305-485A-40A3-84B0-9303E2D782E5
Submitted by: 1D8AF305-485A-40A3-84B0-9303E2D782E5
Additional Comments: 6 HOUR PUMP TEST RESULTS SUBMITTED TO KEN HUGO - ENGINEER. WELL BACK FILLED FROM 200' TO 100' WITH 1000 LBS MED BENTONITE CHIPS

Drillers

Driller ID: 11385995
Last Name: PEARSON
Middle Initial:
First Name: RILEY
Journeyman No: 83061A
Is Active?: TRUE

Drilling Companies

Starting Well ID: 9871000
Ending Well ID: 9875999
Last Well ID Used: 2086663
Company Name: BLACK DOG DRILLING & ENV SERV. LTD.
Street Address: BOX 9137
City: SYLVAN LAKE
Province: AB
Country:
Postal Code: T4S 1S8
E-Mail: INFO@BLACKDOGDRILLING.COM
Is Active?: TRUE

Perforations

Perforation ID: 4294102
From: 80.000000
To: 90.000000
Diameter: 0.500000
Interval: 12.000000

Boreholes

Borehole ID: 853520

Diameter: 5.000000
From: 58.000000
To: 200.000000

Boreholes

Borehole ID: 853519
Diameter: 8.750000
From: 0.000000
To: 58.000000

Other Seals

Other Seal ID: 36218
Other Seal Type: Drive Shoe
From:
To:
At: 58.000000

Lithologies

Depth: 48.000000
Water Bearing: FALSE
Colour: Gray
Description:
Material: Clay & Rocks

Lithologies

Depth: 200.000000
Water Bearing: FALSE
Colour: Gray
Description:
Material: Shale

Lithologies

Depth: 72.000000
Water Bearing: FALSE
Colour: Gray
Description:
Material: Shale

Lithologies

Depth: 106.000000
Water Bearing: FALSE
Colour: Gray
Description:
Material: Shale

Lithologies

Depth: 112.000000
Water Bearing: FALSE
Colour: Gray
Description:
Material: Sandstone

Lithologies

Depth:	157.000000
Water Bearing:	FALSE
Colour:	Gray
Description:	
Material:	Sandstone

Lithologies

Depth:	90.000000
Water Bearing:	TRUE
Colour:	Gray
Description:	
Material:	Sandstone

Lithologies

Depth:	150.000000
Water Bearing:	FALSE
Colour:	Gray
Description:	
Material:	Shale

Pump Tests

Pump Test ID:	16033598
Test Date:	2021/11/08
Start Time:	1980/01/01 11:00:00
Taken from Top of Casing:	TRUE
Static Water Level:	7.50
End Water Level:	
Water Removal Type:	Air
Water Removal Rate:	40.00
Removal Depth from:	200.00
Reason for Short Test:	PUMP TEST RESULTS SUBMITTED TO KEN HUGO, ENGINEER

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
7	*1 of 2*	*E/267.0*	*1,017.0 / -3.00*	***NW Quarter of Section: 2 Township: 33 Range: 1 West of: 5 Mountain View , County AB***	***PSP***

Permit NO:	226IJD-03-S0021	***DLS Coordinates:***	NW-02-33-01-W5
Issue Date:	2003/07/14	***Municipality:***	Mountain View , County
Description:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
7	*2 of 2*	*E/267.0*	*1,017.0 / -3.00*	***NW Quarter of Section: 2 Township: 33 Range: 1 West of: 5 Mountain View , County AB***	***PSP***

Permit NO:	226IJD-05-S0047	***DLS Coordinates:***	NW-02-33-01-W5
Issue Date:	2005/11/28	***Municipality:***	Mountain View , County
Description:			

Unplottable Summary

Total: 0 Unplottable sites

DB	Company Name/Site Name	Address	City	Postal

Unplottable Report

No unplottable records were found that may be relevant for the search criteria.

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ***Note:*** *Databases denoted with " * " indicates that the database will no longer be updated. See the individual database description for more information.*

Well Licenses: Provincial AERW

Locations of Well Licenses made available by the Alberta Energy Regulator (AER) as ST37. Includes Active, Suspended, Abandoned, Drilled and Cased Oil, Gas, Crude Bitumen well licenses, as well as Observation, Injection, Disposal, and Undefined well licences.

Government Publication Date: Aug 31, 2023

Agriculture and Fisheries - Certificates of Approval: Provincial AGR

This database contains approvals for processes pertaining to drying of alfalfa/forage/peat, feedlots, fish farms and feed/seed mills. Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1993-2012

Alberta Oil and Gas Wells: Provincial AOGW

The Alberta Energy Utilities Board - now the Alberta Energy Regulator (AER) - maintained a database of oil and gas wells drilled in the province of Alberta. The database contains information on well name, licensee name, license number, location, status, total well depth and date of final drilling. Please note that this database will not be updated, information on wells drilled after September 2003 can be found in the Oil and Gas Wells (OGW) database under the 'Private Source Database' section.

Government Publication Date: 1883-Sept 2003*

Authorizations: Provincial AUTH

Locations associated with Water Act and Environmental Protection and Enhancement Act (EPEA) documents issued by Alberta Environment and Parks (AEP). Includes approvals, licences, registrations, authorizations, permits, and certificates. This list is made available by the Alberta Environment and Parks (AEP).

Government Publication Date: Jul 2023

Automobile Wrecking & Supplies: Private AUWR

This database provides an inventory of known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Government Publication Date: 1999-Oct 31, 2023

Waste Management Facilities - Certificates of Approval: Provincial CAWD

This database contains approvals for processes pertaining to waste management facilities (hazardous waste manifesting, waste disposal/incineration/open burning/processing/storage/treatment). Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1993 - Jan 2020

Commercial Activity Risk - City of Calgary Business Licenses: Provincial CBL

List of locations with Business Licences for the follow commercial activities: apartment building with 4 or more stories, auto-body shop, fabric cleaning, manufacturing, motor vehicle dealerships and service/repair, and salvage yard/auto wrecking. Data made available by the City of Calgary.

Government Publication Date: Sep 30, 2023

Dry Cleaning Facilities: Federal CDRY

List of dry cleaning facilities made available by Environment and Climate Change Canada. Environment and Climate Change Canada's Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations (SOR/2003-79) are intended to reduce releases of tetrachloroethylene to the environment from dry cleaning facilities.

Government Publication Date: Jan 2004-Dec 2021

Confined Feeding Operations: Provincial CFO

In 1991, the Natural Resources Conservation Board (NRCB) was created to review applications for approval of major natural resource development projects in Alberta. In January 2002, the NRCB was given the responsibility to regulate the Confined Feeding Operation industry. The Agricultural Operation Practices Act defines a confined feeding operation to be: "an activity on land that is fenced or enclosed or within buildings where livestock are confined for the purpose of growing, sustaining, finishing or breeding by means other than grazing, but does not include seasonal feeding and bedding sites." Under the AOPA regulations, all new or expanding confined feeding operations (CFOs) or manure storage facilities are required to make an application for Approval, Registration or Authorization to the NRCB before construction or expansion commences. Geographic coordinates were provided in DLS (Dominion Land Survey) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the Quarter section only.

Government Publication Date: 2002-Sep 2023

Chemical Processing Operations - Certificates of Approval: Provincial CHEM

This database contains approvals for processes pertaining to the manufacturing and use of chemical products and pesticides. Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1993-2012

Chemical Register: Private CHM

This database includes a listing of locations of facilities within the Province or Territory that either manufacture and/or distributes chemicals.

Government Publication Date: 1999-Oct 31, 2023

Compost Facilities: Provincial CMPS

A list of compost facility registrations made available by Alberta Environment and Parks (AEP). Composting facilities operating under a registration are required to follow the requirements in the Code of Practice for Compost Facilities, which outlines the minimum requirements for the design, construction, operation, and reclamation of compost facilities that accept up to 20,000 tonnes of feedstock per year.

Government Publication Date: Dec 31, 2019

Compressed Natural Gas Stations: Private CNG

Canada has a network of public access compressed natural gas (CNG) refuelling stations. These stations dispense natural gas in compressed form at 3,000 pounds per square inch (psi), the pressure which is allowed within the current Canadian codes and standards. The majority of natural gas refuelling is located at existing retail gasoline that have a separate refuelling island for natural gas. This list of stations is made available by the Canadian Natural Gas Vehicle Alliance.

Government Publication Date: Dec 2012 -Aug 2023

Compliance and Convictions: Provincial CONV

This listing of enforcement actions under the Alberta Environment and Protected Areas' current legislation is maintained by the Government of Alberta. Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Unfortunately, from state of the data, the location that the address pertains to cannot be confirmed.

Government Publication Date: 1993-Dec 2022

Fuel Sales and Storage: Provincial CTNK

List of locations with Business Licences for fuel sales and storage. Data made available by the City of Calgary.

Government Publication Date: Sep 30, 2023

Approved Oilfield Waste Management Facilities: Provincial DRWD

A list of approved first and third party oilfield waste management facilities. First-party receivers can only accept upstream oilfield waste generated by one oil and gas company, but can come from various sites. Third-party receivers can accept upstream oilfield waste from various sites and various generators. This data is made available by the Alberta Energy Regulator (AER).

Government Publication Date: Sep 2023

Enforcement Action Summary: Provincial EAS

This database maintained by the Alberta Energy Regulator (AER) - formerly the Energy Resources Conservation Board (ERCB) - summarizes high risk enforcement action 1, high risk enforcement action 2 (persistent noncompliance), high risk enforcement action 3 (failure to comply or demonstrated disregard), low risk enforcement action - global REFER and legislative/regulatory enforcement action. Fields will include licensee/company name, non-compliance event, date of enforcement, location, etc.

Government Publication Date: 2007-Aug 2023

Commercial Activity Risk - City of Edmonton Business Licenses: Provincial EBL

List of locations with Business Licenses for the follow commercial activities: cannabis processing or cultivation, construction vehicle and equipment sales/rentals, livestock operation, general industrial, and vehicle repair. Data made available by the City of Edmonton.

Government Publication Date: Feb 28, 2023

Environmental Compliance Prosecutions: Provincial ECMP

A list of concluded prosecutions made under environmental legislation. Listing made available by the Government of Alberta. This is not a complete and comprehensive list of environmental compliance outcomes: in Alberta, enforcement tools include warning letters, violation tickets, administrative penalties and orders, in addition to prosecutions.

Government Publication Date: Sep 30, 2023

Environmental Effects Monitoring: Federal EEM

The Environmental Effects Monitoring program assesses the effects of effluent from industrial or other sources on fish, fish habitat and human usage of fisheries resources. Since 1992, pulp and paper mills have been required to conduct EEM studies under the Pulp and Paper Effluent Regulations. This database provides information on the mill name, geographical location and sub-lethal toxicity data.

Government Publication Date: 1992-2007*

ERIS Historical Searches: Private EHS

ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Government Publication Date: 1999-Sep 30, 2023

Environmental Issues Inventory System: Federal EIIS

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

Government Publication Date: 1992-2001*

Alberta Environment & Parks Storage Tanks: Provincial EPST

List of storage tanks under the purview of Alberta Environment and Parks.

Government Publication Date: Jul 31, 2016

Environment Protection & Enhancement Act and Water Act Public Notices: Provincial EPWN

A list of Public Notices of Applications, Decisions, and Revisions pertaining to applications made to Alberta Environment and Parks under the Water Act (WA) and Alberta Environment Protection and Enhancement Act (EPEA). Dominion Land Survey (DLS) locations provided by the source are subject to accuracy limitations inherent to the DLS system.

Government Publication Date: Sep 30, 2022

Environmental Site Assessment Repository: Provincial ESAR

Environmental site assessments determine the quality of soil and groundwater of a site, particularly at retail gas stations and other commercial and industrial sites. A site assessment does not necessarily mean a site is, or ever was, contaminated. Alberta's Environmental Site Assessment Repository (ESAR) is an online, searchable database that provides scientific and technical information about assessed and/or reclaimed sites throughout Alberta. Search Alberta's ESAR using meridian, range, township, and section values at http://www.esar.alberta.ca/esarmain.aspx to gain access to reclamation certificates and/or associated files (applications, reports).

Government Publication Date: 1960-Jul 2023

Edmonton Vehicle Fueling Stations: Provincial ETNK

A list of sites that have a City of Edmonton business license for Vehicle Fueling Stations. Listing made available by the City of Edmonton.

Government Publication Date: Feb 28, 2023

Facility List: Provincial FAC

This database contains a complete list of new, active and suspended facilities in Alberta including batteries, gas plants, meter stations, and other facilities. Information provided includes: facility id, facility name, operator name, sub type description, location, facility l license no, and operational status; now includes EDCT (Energy Development Category Type) type and description. Made available by the Alberta Energy Regulator (AER) - formerly the Energy Resources Conservation Board (ERCB).

Government Publication Date: Up to Aug 31, 2023

Federal Convictions: Federal FCON

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Government Publication Date: 1988-Jun 2007*

Contaminated Sites on Federal Land: Federal FCS

The Federal Contaminated Sites Inventory includes information on known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment. The inventory also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. It does not include sites where contamination has been caused by, and which are under the control of, enterprise Crown corporations, private individuals, firms or other levels of government. Includes fire training sites and sites at which Per- and Polyfluoroalkyl Substances (PFAS) are a concern.

Government Publication Date: Jun 2000-Jun 2023

AER Incidents & Spills: Provincial FIS

Received from the Alberta Energy Regulator (AER) - formerly the ERCB (Energy Resources Conservation Board) and EUB (Energy Utilities Board) - this database, which used to be called EISL (Environmental Information System Listing), contains reported environmental incidents beginning in 1975. Descriptions include noise infractions, air quality emissions, oil spills and failures for pipelines, wells, plants, and batteries. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1975 - Sep 2023

Food Processing Operations - Certificates of Approval: Provincial FOOD

This database contains approvals for processes pertaining to the manufacturing of food products. Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1993-2012

Federal Identification Registry for Storage Tank Systems (FIRSTS): Federal FRST

A list of federally regulated Storage tanks from the Federal Identification Registry for Storage Tank Systems (FIRSTS). FIRSTS is Environment and Climate Change Canada's database of storage tank systems subject to the Storage Tank for Petroleum Products and Allied Petroleum Products Regulations. The main objective of the Regulations is to prevent soil and groundwater contamination from storage tank systems located on federal and aboriginal lands. Storage tank systems that do not have a valid identification number displayed in a readily visible location on or near the storage tank system may be refused product delivery.

Government Publication Date: Oct 31, 2021

Fuel Storage Tanks: Provincial FST

List tank sites in unaccredited areas of the Province. Includes active tank sites, sites with tanks temporarily out of service, and sites at which tanks have been removed from the ground. Information in this database was collected according to Alberta Regulation AR 291/95 Storage Tank System Management and to AR 52/98 Fire Code which was formerly the Alberta Fire Code Regulation, 1992 (AR 204/92). The Petroleum Tank Management Association of Alberta (PTMAA) regulated Storage Tanks in unaccredited areas of Alberta from 1994 until June 2020, at which point the Safety Codes Council assumed responsibility for services related to storage tank management.

Government Publication Date: 1985-Sep 2023

Waste Generators Summary: Provincial GEN

Under Alberta's Waste Control Regulation, Alta. Reg. 192/96, a generator is a person who consigns hazardous waste for storage, transport, treatment or disposal. As of 2007, Alberta Environment no longer provides detailed information on each waste generator, such as approval number, class, and class description.

Government Publication Date: 1993-Aug 2018

Greenhouse Gas Emissions from Large Facilities: Federal GHG

List of greenhouse gas emissions from large facilities made available by Environment Canada. Greenhouse gas emissions in kilotonnes of carbon dioxide equivalents (kt CO2 eq).

Government Publication Date: 2013-Dec 2020

Gas Processing Plants: Provincial GPP

The Alberta Energy Regulator (AER) - formerly the ERCB (Energy Resources Conservation Board) - has an inventory of all Gas Processing Plants in Alberta, with information such as location, names of plant, facility type, operator name, facility license, design capacities, etc.

Government Publication Date: Oct 2016-Aug 31, 2022

Alberta Environment's H.E.L.P. (Help End Landfill Pollution) Program Database: Provincial HELP

The H.E.L.P. Data Tracking and Management Control System was created to provide tracking and management capabilities of industrial landfills in Alberta for the Department of Environment. Detailed information including company name, location, type of landfill, priority, score, status, use and much more is included in this database.

Government Publication Date: June 1988*

Horizontal Wells: Provincial HORW

A horizontal well is created by drilling the lower part of the wellbore parallel to the zone of interest. These wells must be drilled directionally at an angle exceeding 80 degrees. Horizontal drilling can help increase resource recovery while minimizing surface impacts. While horizontal drilling has been used for decades, technological improvements have made it possible to combine horizontal drilling with hydraulic fracturing to help coax oil and natural gas out of tight rock. Today, more than half of western Canada's wells are being drilled horizontally. Horizontal well list includes: well location, licence number, well name, licensee name, final drilling date, total depth, and true vertical depth. List is made available by the Alberta Energy Regulator (AER) - formerly the Energy Resources Conservation Board (ERCB).

Government Publication Date: Mar 2015-Aug 31, 2023

Indian & Northern Affairs Fuel Tanks: Federal IAFT

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

Government Publication Date: 1950-Aug 2003*

Identification and Verification of Active and Inactive Land Disposal Sites: Provincial LDS

In late 1981, Environment Canada and Alberta Environment initiated a project to identify and verify land disposal sites in the province of Alberta. A point scoring system was used to classify the sites into potential priority 1, priority 2 or priority 3 groups on the basis of the type of waste received at the sites and the site environment. Sites that, according to available information, may pose a hazard to public health and safety or the environment are classified as potential priority 1 sites.

Government Publication Date: Oct 1982*

Land Disposal Sites on Indian Reserves: Provincial LDSI

In late 1981, Environment Canada and Alberta Environment initiated a project to identify and verify land disposal sites in the province of Alberta. This database specifically identifies land disposal sites on Indian Reserves. Information on each site is limited to: location, band, size and general comments.

Government Publication Date: Oct 1982*

Landfill Registrations: Provincial LNDF

A list of landfill registrations made available by Alberta Environment and Parks (AEP). Landfills operating under a registration are required to follow the requirements in the Code of Practice for Landfills, which outlines the minimum requirements for the construction, operation and reclamation of landfills that accept 10,000 tonnes or less per year of non-hazardous and inert waste.

Government Publication Date: Mar 31, 2020

Lumber Related Operations - Certificates of Approval: Provincial LUM

This database contains approvals for processes pertaining to the manufacturing of wood products, pulp and paper including the associated water treatment processes. Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1993-2012

Canadian Mine Locations: Private MINE

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Government Publication Date: 1998-2009*

Metals, Minerals and Building Materials Operations - Certificates of Approval: Provincial MMB

This database contains approvals for processes pertaining to the manufacturing of building materials, metals, and mineral products. Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1993-2012

Mineral Occurrences: Provincial MNR

The AMDO (Alberta Mineral Deposits and Occurrences) application was created by the Minerals and Coal Geoscience Section of the Alberta Geological Survey as a database for mineral deposits in Alberta in the early 1990s. This is a one time inventory and will not be updated.

Government Publication Date: 1993-2003*

National Analysis of Trends in Emergencies System (NATES): Federal NATE

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

Government Publication Date: 1974-1994*

PTMAA Non-Compliant Storage Tanks: Provincial NCST

The Alberta Fire Code requires that storage tanks be registered. Tanks may not be registered because they do not meet minimum equipment standards or the owners have not made the annual registration application or paid the necessary registration fees. Some tank owners have installed tanks without a permit. This source contains information on facilities which have tanks that have ceased to be registered or have never been registered. It is maintained and updated by the Petroleum Tank Management Association of Alberta (PTMAA).

Government Publication Date: Sep 2016-May 31, 2020

National Defense & Canadian Forces Fuel Tanks: Federal NDFT

The Department of National Defense and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.

Government Publication Date: Up to May 2001*

National Defense & Canadian Forces Spills: Federal NDSP

The Department of National Defense and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

Government Publication Date: Mar 1999-Oct 2022

National Defence & Canadian Forces Waste Disposal Sites: Federal NDWD

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

Government Publication Date: 2001-Apr 2007*

National Energy Board Pipeline Incidents: Federal NEBI

Locations of pipeline incidents from 2008 to present, made available by the Canada Energy Regulator (CER) - previously the National Energy Board (NEB). Includes incidents reported under the Onshore Pipeline Regulations and the Processing Plant Regulations related to pipelines under federal jurisdiction, does not include incident data related to pipelines under provincial or territorial jurisdiction.

Government Publication Date: 2008-Jun 30, 2021

National Energy Board Wells: Federal NEBP

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

Government Publication Date: 1920-Feb 2003*

National Environmental Emergencies System (NEES): Federal NEES

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for previous Environment Canada spill datasets. NEES is composed of the historic datasets ' or Trends ' which dates from approximately 1974 to present. NEES Trends is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

Government Publication Date: 1974-2003*

National PCB Inventory: Federal NPCB

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. Federal out-of-service PCB containing equipment and PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites. Some addresses provided may be Head Office addresses and are not necessarily the location of where the waste is being used or stored.

Government Publication Date: 1988-2008*

National Pollutant Release Inventory 1993-2020: Federal NPR2

The National Pollutant Release Inventory (NPRI) is Canada's public inventory of pollutant releases (to air, water and land), disposals, and transfers for recycling. The inventory, managed by Environment and Climate Change Canada, tracks over 300 substances. Under the authority of the Canadian Environmental Protection Act (CEPA), owners or operators of facilities that meet published reporting requirements are required to report to the NPRI.

Government Publication Date: Sep 2020

National Pollutant Release Inventory - Historic: Federal NPRI

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances. This data holds historic records; current records are found in NPR2.

Government Publication Date: 1993-May 2017

Operating and Abandoned Mines: Provincial OAM

This data is based on the 2001 edition (revised in 2003), published by the Alberta Energy and Utilities Board (EUB) now the Alberta Energy Regulator (AER). It was a one time inventory of Operating and Abandoned Coal Mines in Alberta. In 1905, Alberta began to catalogue coal mines by assigning a unique number to each operation. This database will provide information on location, mine #, mine name, mine company, life span, amount of coal produced, depth, thickness and other important information concerning the mine.

Government Publication Date: 2001, 2003*

Oil and Gas Facilities - ST102 & ST50: Provincial OGF

This list of batteries, gas plants, meter stations, and other facilities in the province of Alberta, made available as Reports ST102 (Parts A and B) and ST50 (A and B), is provided by the Alberta Energy Regulator (AER).

Government Publication Date: Jul 31, 2023

Oil and Gas Wells: Private OGWW

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Government Publication Date: 1988-Aug 31, 2023

Enforcement Orders: Provincial ORD

List of enforcement orders issued by Alberta Environment and Parks (AEP). Alberta Environment and Parks encourages compliance with environmental legislation. When individuals, companies, or municipalities fail to comply with legislation, the department has several options to ensure compliance. This listing, made available by the Alberta Government, includes Compliance Orders, Enforcement Orders, Environmental Protection Orders, Orders to Vacate, and Water Management Orders.

Government Publication Date: Jul 31, 2023

Alberta Orphan Wells: Provincial ORP

The Orphan Well Association (OWA) maintains lists of properties designated as orphan by the Alberta Energy Regulator (AER). Includes the location, well ID, licensee name and license number of orphan wells, sites, and facilities that have been identified for the purpose of abandonment, suspension, decommission, and reclamation. Legacy wells under long term care and custody are excluded. Please note that the OWA Orphan List also includes properties with production information from the AER. The OWA makes no representation, warranties, or guarantees, expressed or implied, for the fitness of the data with respect to its use.

Government Publication Date: Jan 2007-Aug 31, 2021

Canadian Pulp and Paper: Private PAP

This information is part of the Pulp and Paper Canada Directory. The Directory provides a comprehensive listing of the locations of pulp and paper mills and the products that they produce.

Government Publication Date: 1999, 2002, 2004, 2005, 2009-2014

Parks Canada Fuel Storage Tanks: Federal PCFT

Canadian Heritage maintains an inventory of known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Government Publication Date: 1920-Jan 2005*

Petrochemical, Coal and Gas Operations - Certificates of Approval: Provincial PCG

This database contains approvals for processes pertaining to petroleum, coal, and oil and gas processing. Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1993-2012

Pesticide Register: Provincial PES

This is a list of Registered Pesticide Vendors in Alberta (retail and wholesale). The pesticide vendor list is comprised of vendors who have both audited AWSA pesticide storage facilities as part of their operation, and those vendors that do not have an audited AWSA pesticide storage facilities. Non-audited retail and wholesale vendors may be selling products that are not covered by the AWSA program, or may be utilizing external AWSA pesticide warehouses. Registration numbers and expiry dates are identified for each operation. If a registration number is not present, the operation's vendor registration is in the process of renewal.

Government Publication Date: 1998-Aug 2015

NPRI Reporters - PFAS Substances: Federal PFCH

The National Pollutant Release Inventory (NPRI) is Canada's public inventory of releases, disposals, and transfers, tracking over 320 pollutants. Per - and polyfluoroalkyl substances (PFAS) are a group of over 4,700 human-made substances for which adverse environmental and health effects have been observed. This listing of PFAS substance reporters includes those NPRI facilities that reported substances that are found in either: a) the Comprehensive Global Database of PFASs compiled by the Organisation for Economic Co-operation and Development (OECD), b) the US Environmental Protection Agency (US EPA) Master List of PFAS Substances, c) the US EPA list of PFAS chemicals without explicit structures, or d) the US EPA list of PFAS structures (encompassing the largest set of structures having sufficient levels of fluorination to potentially impart PFAS-type properties).

Government Publication Date: Sep 2020

Potential PFAS Handers from NPRI: Federal PFHA

The National Pollutant Release Inventory (NPRI) is Canada's public inventory of releases, disposals, and transfers, tracking over 320 pollutants. Per - and polyfluoroalkyl substances (PFAS) are a group of over 4,700 human-made substances for which adverse environmental and health effects have been observed. This list of potential PFAS handlers includes those NPRI facilities that reported business activity (NAICS code) included in the US Environmental Protection Agency (US EPA) list of Potential PFAS-Handling Industry Sectors, further described as operating in industry sectors where literature reviews indicate that PFAS may be handled and/or released. Inclusion of a facility in this listing does not indicate that PFAS are being manufactured, processed, used, or released by the facility - these are facilities that potentially handle PFAS based on their industrial profile.

Government Publication Date: Sep 2020

Conglomerate and Waste Management Facilities: Provincial PITS

This database contains approvals for processes pertaining to the use of gravel pits, sand pits, and clay pits. Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1993-2012

Alberta Private Sewage Disposal Permits: Provincial PSP

These permits are private sewage disposal permits that have been issued to owners and contractors. They would include various types of installations including holding tanks, septic tanks, packaged treatment plants, sand filters, fields, mounds, lagoons and open discharges. In 2003 Alberta Municipal Affairs started collecting information and issuing permits using an electronic permitting system. These records include all private sewage disposal permits within the jurisdiction of Alberta Municipal Affairs.

Government Publication Date: 2003-2013

PTMAA Approved (Open) Permits: Provincial PTAP

The Petroleum Tank Management Association of Alberta maintains a list of open permits it has issued within its jurisdiction. Prior to installing, removing, or altering tanks, storage tanks owners must receive approval in the form of a permit from the Authority Having Jurisdiction (in this case, PTMAA).

Government Publication Date: Apr 2016-Apr 30, 2020

Hazardous Waste Receivers Summary: Provincial REC

A waste receiving location is any site or facility to which waste is transferred through a waste carrier. A receiver of regulated waste is required to register the waste receiving facility. This database represents receivers of regulated wastes under Alberta's Waste Control Regulation, Alta. Reg. 192/96. As of 2007, Alberta Environment no longer provides detailed information on each waste receiver, such as approval number, class, and class description.

Government Publication Date: 1993-Aug 2018

Alberta Recyclers: Provincial RECY

List of Alberta Recyclers under the following recycling programs: electronics processors, paint processors, tire processors, and used oil processors. Listing made available by the Alberta Recycling Management Authority (ARMA).

Government Publication Date: Jul 2023

Retail Fuel Storage Tanks: Private RST

This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks.

Government Publication Date: 1999-Oct 31, 2023

Scott's Manufacturing Directory: Private SCT

Scott's Directories is a data bank containing information on over 200,000 manufacturers across Canada. Even though Scott's listings are voluntary, it is the most comprehensive database of Canadian manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

Government Publication Date: 1992-Mar 2011*

Special Operation Classifications - Certificates of Approval: Provincial SPEC

This database contains approvals for processes pertaining to classifications listed as special operations (i.e. locations owned/operated by municipalities, operations that involve the presence of pesticides). Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1993-2012

Inventory of Waste Disposal Sites: Private WDS

This one time inventory is a compilation of information collected from each region and pertains to active, regulated waste disposal sites within the province of Alberta. In the past, waste disposal sites were registered with both regional and health offices. That process was dissolved and regional landfills were developed. There is no central source of this information. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1998*

Wastewater Operations: Provincial WSTE

This database contains approvals for processes pertaining to wastewater treatment systems. Please note that, as per the source of this database, some of the geographic information may pertain to a head office or mailing address and not necessarily the site of operations to which the certificate applies. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Government Publication Date: 1993-2012

Alberta Water Well Information Database: Provincial WWIS

List of wells in the Alberta Water Well Information Database made available by Alberta Environment and Parks, containing approximately 500,000 records with nearly 5,000 drilling reports added annually. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location; some locations will be accurate to the quarter section only. The Province of Alberta advises that the data may not be fully checked, and disclaims all responsibility for its accuracy. This data was previously collected from the Groundwater Information Center of the Natural Resource Service.

Government Publication Date: 1880-Aug 31, 2023

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

APPENDIX H

AEP Approvals

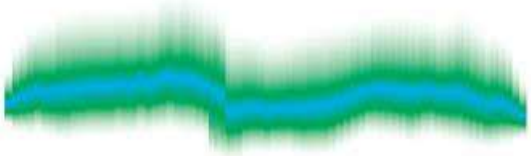
Bifröst

Environmental and Remediation Services Inc.

APPENDIX H1

Alberta EPA –

Approval Notices Reclamation



Bifröst

Environmental and Remediation Services Inc.

Alberta Energy Regulator | Alberta Environment and Protected Areas

Authorization Viewer | Traditional Agriculture Registration Viewer | Public Notices Viewer | Help

Authorization Viewer - Search Results

⚠ For Water Act approvals, amendments and Code of Practice notifications issued by the Alberta Energy Regulator during or after 2018, please refer to the following link OneStop Application Query Tool (aer.ca).

The Search Used the Following Values:	
Legal Land Location:	SE 03-033-01-W5
Act / Document Type:	Water Act, EPEA
Show Inactive Authorizations:	Yes

The resulting Authorizations based on the search criteria will be displayed below. A PDF will appear next to the Authorization when documentation is available for viewing or downloading. Please click Viewer Help if you encounter problems viewing the Authorization document.

2 Result(s)

	Document 00122969-00-00 MPCL CDN-SUP OLDS 7-3-33-1 WELL AND ACCESS ROAD is held by Repsol Oil & Gas Canada Inc., under the provisions of the *Environmental Protection & Enhancement Act*. This Reclamation Certificate is currently issued as of May. 31, 1979 and does not expire.
PDF	Document 00223038-00-00 LONEPINE WEST TORRINGTON GATHERING SYSTEM PIPELINE PROJECT is held by Paramount Resources (ACL) Ltd., under the provisions of the *Environmental Protection & Enhancement Act*. This Approval is currently expired and renewable.

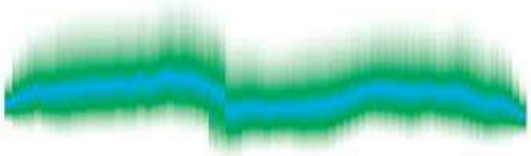
Clear & Return

Comments regarding the Authorization Viewer page may be directed to the Regulatory Programs Branch RAC.Environment@gov.ab.ca.

APPENDIX H2

Alberta EPA –

Approval Notices Pipeline



Bifröst

Environmental and Remediation Services Inc.

Alberta Energy Regulator | Alberta Environment and Protected Areas

Authorization Viewer | Traditional Agriculture Registration Viewer | Public Notices Viewer | Help

Authorization Viewer - Search Results

⚠ For Water Act approvals, amendments and Code of Practice notifications issued by the Alberta Energy Regulator during or after 2018, please refer to the following link OneStop Application Query Tool (aer.ca).

The Search Used the Following Values:	
Legal Land Location:	SE 03-033-01-W5
Act / Document Type:	Water Act, EPEA
Show Inactive Authorizations:	Yes

The resulting Authorizations based on the search criteria will be displayed below. A PDF will appear next to the Authorization when documentation is available for viewing or downloading. Please click Viewer Help if you encounter problems viewing the Authorization document.

2 Result(s)

	Document 00122969-00-00 MPCL CDN-SUP OLDS 7-3-33-1 WELL AND ACCESS ROAD is held by Repsol Oil & Gas Canada Inc., under the provisions of the *Environmental Protection & Enhancement Act*. This Reclamation Certificate is currently issued as of May. 31, 1979 and does not expire.
PDF	Document 00223038-00-00 LONEPINE WEST TORRINGTON GATHERING SYSTEM PIPELINE PROJECT is held by Paramount Resources (ACL) Ltd., under the provisions of the *Environmental Protection & Enhancement Act*. This Approval is currently expired and renewable.

Clear & Return

Comments regarding the Authorization Viewer page may be directed to the Regulatory Programs Branch RAC.Environment@gov.ab.ca.

ENVIRONMENT

APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended

APPLICATION NO. 001-223038

APPROVAL NO. 223038-00-00

EFFECTIVE DATE. January 17, 2006

EXPIRY DATE. January 16, 2011

APPROVAL HOLDER. Apache Canada Ltd.

Pursuant to Division 2, Part 2, of the Environmental Protection and Enhancement Act, R.S.A. 2000, c.E-12, as amended, approval is granted subject to the attached terms and conditions for the following activity:

the construction and reclamation of a pipeline being the Lonepine / Torrington Gas Gathering System Pipeline Project.

Designated Director under the Act
David L. Ardell, P. Eng.

Date signed January 17, 2006

PART 1: DEFINITIONS

1.1 All definitions from the **Act** and the **regulations** apply except where expressly defined in this approval.

1.2 In all PARTS of this approval:

(a) **"Act"** means the Environmental Protection and Enhancement Act, R.S.A. 2000, c.E-12, as amended;

(b) **"application"** means the written submissions to the **Director** in respect of application number 001-223038 and any subsequent amendments of approval number 223038-00-00;

(c) "**Director**" means an employee of the Government of Alberta designated as a Director under the Act;

(d) **"domestic wastewater"** means any water or materials produced by the collection and containment of sanitary sewage and effluent;

(e) **"grab sample"** means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;

(f) **"industrial wastewater"** means the water and water-carried wastes produced by any industrial process for construction or reclamation carried on, within or immediately adjacent to the **pipeline alignment**, including captured surface runoff from adjacent undisturbed areas or any water that accumulates in the pipe trench, but does not include **domestic wastewater**.

(g) **"Inspector"** means an employee of the Government of Alberta designated as an Inspector or an Investigator under the Act;

(h) **"overstrip"** means a soil handling procedure where **topsoil** and **upper subsoil** are removed together**.**

(i) **"pipeline alignment"** means the approved route and all surface disturbances resulting from the construction or reclamation of the pipeline;

(j) **"problem soils"** means a soil map unit where there is a significant difference in soil quality between the **upper subsoil** and the **spoil**;

(k) **"regulations"** means the regulations issued pursuant to the **Act**, as amended;

(l) **"spoil"** means any material below the **topsoil** and **upper subsoil** layers removed during excavation of the trench;

(m) **"three-lift"** means a soil handling procedure for **problem soils** where the **topsoil**, **upper subsoil** and **spoil** are individually salvaged, stored and replaced in three separate layers;

(n) **"topsoil"** means the uppermost layer of soil that:

(i) is normally referred to as the plough layer in agricultural soils;
(ii) is typically darker in colour than the **upper subsoil** layer; and
(iii) consists of the **A** horizons as defined in *The System of Soil Classification for Canada, Second Edition,* 1987;

(o) **"two-lift"** means a soil handling procedure where the **topsoil** is salvaged, stored and replaced separately from the **upper subsoil** and **spoil** which are salvaged, stored and replaced together; and

(p) **"upper subsoil"** means, in **problem soils**, the layer of soil directly below the **topsoil** layer that:

(i) contains roots or the root zone;
(ii) is typically lighter in colour than the **topsoil** layer;
(iii) consists of the **B** horizons as defined in *The System of Soil Classification for Canada, Second Edition,* 1987; and
(iv) extends no more than 50 centimetres below the **topsoil** layer;

(q) **"waste"** means any solid or liquid material or product or combination of them, but does not include hazardous waste that is intended to be disposed of, or that is intended to be stored and then disposed of.

PART 2: GENERAL

2.1 General

2.1.1 The approval holder shall immediately report by telephone any contravention of the terms and conditions of this approval to the Director at 1-780-422-4505.

2.1.2 Any conflict between the **application** or any document and the terms and conditions of this approval shall be resolved in favour of the approval.

2.1.3 The terms and conditions of this approval do not affect any rights or obligations created under any other approval issued by Alberta Environment.

2.1.4 The mention of trade names, commercial products or named technologies in this approval does not constitute an endorsement or recommendation by Her Majesty the Queen in Right of Alberta, her employees and agents, and the **Director** for general use.

2.1.5 The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.

2.1.6 The approval holder shall notify the **Director** in writing within 30 days of all changes in the corporate status of the approval holder.

2.1.7 If the approval holder monitors for any substance or parameters which are the subject of operational limits as set out in this approval more frequently than is required and using

procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the reports required by this approval.

2.1.8 All abbreviations used in this approval follow those given in *Standard Methods for the Examination of Water and Wastewater* published jointly by the American Public Health Association, the American Water Works Association, and the Water Environment Federation, as amended, or as otherwise specified in this approval.

2.1.9 Where the approval holder contracts for the provision of services during construction and reclamation of the pipeline, the approval holder shall ensure that:

(a) contractors and sub-contractors are provided with a copy of the approval terms and conditions that are pertinent to the service provided by the contractor or sub-contractor;

(b) contractors and sub-contractors are provided with a copy of the section of the environmental protection plan pertinent to the service provided by the contractor or sub-contractor; and

(c) contractors and sub-contractors authorize a person or persons to halt a construction or reclamation activity in circumstances where, in the judgement of that person or persons, the construction or reclamation activity is not being conducted in accordance with the approval terms and conditions or sections of the environmental protection plan.

2.1.10 At least seven days prior to the commencement of construction, the approval holder shall notify the regional **Inspector** of commencement of construction.

2.2 Record Keeping

2.2.1 The approval holder shall record and retain all the following information for a minimum of five years:

(a) the names and addresses of all persons who discover any contravention of the **Act**, the **regulations** or this approval;

(b) the names and addresses of all persons who take any remedial action arising from the contravention of the **Act**, the **regulations** or this approval; and

(c) a detailed description of any remedial measures taken in respect of a contravention of the **Act**, the **regulations** or this approval.

2.2.2 The approval holder shall record and retain all of the following information in respect of any sampling for a minimum of five years:

(a) the place, date and time of sampling;

(b) the dates the analyses were performed

(c) the analytical techniques, methods or procedures used in the analyses;

(d) the names of the persons who collected and analyzed each sample; and

(e) the results of the analyses.

2.3 Analytical Requirements

2.3.1 Collection and analysis of samples shall be conducted in the following manner, unless otherwise specified in writing by the **Director**:

(a) for **industrial wastewater**, groundwater, waterworks and **domestic wastewater** parameters:

(i) *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, American Water Works Association, Water Environment Federation, as amended, or
(ii) *Methods Manual for Chemical Analysis of Water and Wastes*, Alberta Environmental Centre, as amended.

PART 3: CONSTRUCTION

3.1 Land Conservation

Soil Conservation

3.1.1 The approval holder shall salvage soil materials from the **pipeline alignment** using one or more of the following soil handling procedures:

(a) a **two-lift** soil handling procedure with **topsoil** salvage depths and widths as described in the **application**; or

(b) a **three-lift** soil handling procedure with **topsoil** and **upper subsoil** salvage depths and widths as described in the **application**; or

(c) an **overstrip** soil handling procedure with combined **topsoil** and **upper subsoil** salvage depths and widths as described in the **application**; or

(d) any other soil handling procedures with **topsoil** or **upper subsoil** salvage depths and widths as described in the **application**; or

(e) any other soil handling procedures with **topsoil** or **upper subsoil** salvage depths and widths as directed in writing by an **Inspector**.

Suspension of Soil Handling

3.1.2 The approval holder shall immediately suspend the salvage or replacement of any **topsoil** and **upper subsoil** when:

(a) wet or frozen field conditions would result in the degradation or loss of **topsoil** or **upper subsoil**; or

(b) wind velocity creates the potential for loss of **topsoil** or **upper subsoil**; or

(c) any other field condition or pipeline construction method could result in the degradation or loss of **topsoil** or **upper subsoil**; or

(d) an **Inspector** provides written direction to do so.

3.1.3 The approval holder shall only recommence the salvage or replacement of **topsoil** or **upper subsoil** when the conditions specified in 3.1.2 no longer exist or when directed in writing by an **Inspector**.

Stockpiling Soil Material

3.1.4 The approval holder shall, when using an **overstrip** soil handling procedure, stockpile all salvaged **topsoil** admixed with **upper subsoil** separately from **spoil**.

3.1.5 The approval holder shall, when using **two-lift** soil handling procedures, stockpile separately all salvaged **topsoil** and **spoil**.

3.1.6 The approval holder shall, when using **three-lift** soil handling procedures, stockpile separately all salvaged **topsoil**, **upper subsoil** and **spoil**.

3.1.7 The approval holder shall stockpile salvaged **topsoil**, **upper subsoil** and **spoil** on the **pipeline alignment** at the locations described in the **application** or at any alternative locations when directed in writing by an **Inspector**.

3.1.8 The approval holder shall stockpile salvaged **topsoil**, **upper subsoil** and **spoil** as follows:

(a) all stockpiles shall be separated from each other as described in the **application**;

(b) all stockpile foundations shall be stable; and

(c) all stockpiles shall be stabilized to prevent wind and water erosion.

Frozen or Unfrozen Soil Conditions

3.1.9 The approval holder shall only use the appropriate soil handling procedures for frozen or unfrozen ground conditions, as described in the **application**, unless otherwise authorized in writing by the **Director**.

Problem Soils

3.1.10 The approval holder shall determine the appropriate soil handling procedures for any **problem soils** encountered along the **pipeline alignment** that were not described in the **application** by:

(a) consulting the *Guidelines For Alternative Soil Handling Procedures During Pipeline Construction*, Alberta Pipeline Environmental Steering committee, June1996; and

(b) obtaining written direction from an **Inspector** before changing any soil handling procedures described in the **application**.

Erosion Control

3.1.11 The approval holder shall use all necessary erosion control measures to prevent the loss of **topsoil** and **upper subsoil** during construction and reclamation.

Water Crossings

3.1.12 The approval holder shall ensure that the flow of water, if present in a watercourse, is maintained during the construction and reclamation of any water crossing.

3.1.13 The approval holder shall, unless otherwise authorized in writing by the **Inspector**, maintain an undisturbed buffer strip of at least thirty metres from:

(a) the top of the bank of the watercourse or waterbody; or

(b) the watercourse or waterbody edge if the banks are poorly defined.

3.1.14 The approval holder shall, when using any open-cut water crossing procedure, stockpile all salvaged **topsoil**, **upper subsoil** or **spoil** at least three metres from:

(a) the watercourse top of bank; or

(b) the watercourse edge if the drainage channel is poorly defined.

3.1.15 The approval holder shall, when making any open-cut water crossing, ensure that all stockpiled **spoil** is contained by using berms or a similar isolation technique.

3.1.16 The approval holder shall not clear, grub or excavate within an undisturbed buffer strip except when directed in writing by an **Inspector**.

3.1.17 The approval holder shall use existing water crossings for equipment and vehicles, unless otherwise directed in writing by an **Inspector**.

3.1.18 The approval holder shall not allow any equipment or vehicles to enter a watercourse before a temporary water crossing is in place.

3.1.19 The approval holder shall follow the *Code of Practice for Pipelines and Telecommunication Lines Crossing a Waterbody* and the *Code or Practice for Watercourse Crossings*, Alberta Environment, May 2000 as amended.

3.1.20 The approval holder shall obtain a Temporary Diversion Licence as required pursuant to the *Water Act* for any activity requiring the diversion of water.

3.2 Waste Management

3.2.1 The approval holder shall ensure that all **waste** is disposed of in an approved waste management facility during construction or stored safely on the **pipeline alignment** and removed for disposal to an approved waste management facility.

3.2.2 The approval holder shall not bury any **waste** within or adjacent to the **pipeline alignment**.

3.3 Domestic Wastewater

3.3.1 The approval holder shall collect, contain and remove all **domestic wastewater** for disposal using:

(a) portable **domestic wastewater** facilities; or

(b) an approved municipal **domestic wastewater** system; or

(c) any other manner authorized in writing by the **Director**.

3.4 Industrial Wastewater

3.4.1 The approval holder shall only discharge **industrial wastewater** directly to a water body or watercourse or onto adjacent undisturbed land in accordance with this approval.

3.4.2 The approval holder shall use energy dissipaters or other erosion control methods when discharging **industrial wastewater** onto adjacent undisturbed land.

3.4.3 The approval holder shall not exceed the limits described in TABLE 3-1 when discharging or releasing any **industrial wastewater** directly to a water body or a watercourse, or indirectly by release or discharge onto undisturbed land that will reach a water body or watercourse.

3.4.4 The approval holder shall monitor all discharges or releases of **industrial wastewater** to a water body or a watercourse as described in TABLE 3-1.

3.4.5 The approval holder shall control the discharge or release of any **industrial wastewater** from the **pipeline alignment** to the surrounding watershed in such a manner that the discharge or release does not result in the erosion or flooding of:

(a) adjacent undisturbed land;

(b) the bed and banks of a receiving watercourse;

(c) the shoreline of a receiving water body; and

(d) the discharge water channel.

3.4.6 The approval holder shall construct any temporary bulk fuel storage or transfer area, within or adjacent to the pipeline alignment, in accordance with the *Guidelines for Secondary Containment for Above Ground Storage Tanks*, Alberta Environmental Protection, 1997, as amended.

TABLE 3-1Limits and Monitoring - Industrial Wastewater

Parameter	Limits (maximum daily)	Sample Type	Frequency	Sample Location
Total Suspended Solids	50 mg/L	**Grab**	Prior to discharge and weekly	release point
pH	6.0 - 9.5 pH units	**Grab**	Prior to discharge and weekly	release point
Oil or other substances	no visible sheen	Visual Observation	Daily	release point
Floating Solids	None – except in trace amounts	Visual Observation	Daily	release point
Visible Foam	None – except in trace amounts	Visual Observation	Daily	release point

Hydrostatic Test Water

3.4.7 The approval holder shall follow the *Code of Practice for the Release of Hydrostatic Test Water from Hydrostatic Testing of Liquid Petroleum and Natural Gas Pipelines*, Alberta Environmental Protection, September 1996 as amended.

PART 4: RECLAMATION

4.1 General

4.1.1 The approval holder shall make every effort to progressively reclaim the **pipeline alignment** when pipeline construction is completed, unless the timing of clean-up and reclamation has been scheduled in the **application** to accommodate frozen or unfrozen ground conditions.

4.1.2 The approval holder shall dismantle and remove all works, buildings, structures, facilities, equipment, apparatus or machinery used during construction or reclamation that will not be used for the operation of the pipeline.

4.1.3 The approval holder shall reclaim all constructed access roads for the **pipeline alignment** that are not remaining as surface improvements or as a designated property access.

4.1.4 The approval holder shall place rollback for access management and erosion control as specified in the **application** or as directed in writing by an **Inspector**.

4.2 Landscape

4.2.1 The approval holder shall contour the **pipeline alignment** so that it is comparable with pre-disturbance conditions and the adjacent undisturbed land unless otherwise directed in writing by an **Inspector**.

4.2.2 The approval holder shall establish drainage on the **pipeline alignment** that is compatible with existing drainage on the adjacent undisturbed land.

4.3 Soil Reconstruction and Compaction

4.3.1 The approval holder shall replace all salvaged soil materials from the **pipeline alignment** as follows, unless otherwise authorized in writing by the **Inspector**:

(a) all **spoil** shall be replaced in the trench and contoured over the trench;

(b) all **upper subsoil** shall be spread evenly over the replaced **spoil**; and

(c) all **topsoil** shall be spread evenly and contoured over the replaced **upper subsoil** or **spoil**.

4.3.2 The approval holder shall alleviate compaction in all replaced **upper subsoil** or **spoil** before **topsoil** replacement. Compacted **upper subsoil** or **spoil** shall be mechanically broken, fractured or shattered to the depth of compaction or 30 centimetres, whichever depth is greater.

4.3.3 The approval holder shall alleviate any compaction in replaced **topsoil**. Depth of cultivation or other mechanical treatments shall be controlled to avoid **topsoil** mixing with **upper subsoil** or **spoil**.

4.4 Water Crossings

4.4.1 The approval holder shall ensure that the profile of any watercourse crossed by the **pipeline alignment** is restored to profiles similar to pre-disturbance conditions.

4.4.2 The approval holder shall ensure that the water crossing approaches for the **pipeline alignment** and the banks of all watercourses open-cut with trenches are contoured comparable with adjacent undisturbed land.

4.4.3 The approval holder shall ensure that any constructed pipeline water crossings on watercourses identified in the **application** as having high erosion potential are properly armoured and stabilized or otherwise protected from erosion.

4.5 Final Reclamation

4.5.1 The approval holder shall ensure that the size and density of coarse fragments (i.e. gravel, rock or stones) within the reclaimed soil profile and on the contoured surface of the **pipeline alignment** are comparable with the adjacent undisturbed land.

4.5.2 The approval holder shall revegetate and stabilize the contoured surface of the **pipeline alignment** with a suitable seed mixture and fertilizer. Other forms of revegetation that are not described in the application shall only be applied when directed in writing by an **Inspector**.

4.5.3 The approval holder shall revegetate and stabilize the contoured surface of the **pipeline alignment** crossing any native prairie areas using a certified seed mixture containing only native species. Other forms of revegetation that are not described in the **application**, shall be applied only when directed in writing by an **Inspector** or the landowner.

4.5.4 The approval holder shall maintain a weed control program until new vegetation on the **pipeline alignment** is re-established and is self-sustaining.

4.5.5 The approval holder shall submit a Post-Construction Reclamation Assessment Plan, for authorization by the **Inspector**, on or before April 28, 2006, unless otherwise authorized in writing by the **Inspector**.

4.5.6 The Post-Construction Reclamation Assessment Plan described in 4.5.5 shall include, but not be limited to, a description of the assessment timing and the methods to be used to assess reclamation and determine whether equivalent capability has been restored on the **pipeline alignment**, as well as the schedule for the submission of a Post-Construction Reclamation Assessment Report.

4.5.7 The approval holder shall implement the Post Construction Reclamation Assessment Plan as authorized in 4.5.5, unless otherwise authorized in writing by the **Inspector.**

DATED: January 17, 2006

DESIGNATED DIRECTOR UNDER THE ACT
DAVID L. ARDELL, P. ENG.

APPENDIX I

AEP Historical Environmental Enforcement Search

Bifröst

Environmental and Remediation Services Inc.

Search enforcements

All search fields are optional.

Accountable Party

1273927 Alberta

Action

All

From (mm/dd/yyyy)

yyyy-mm-dd

To (mm/dd/yyyy)

yyyy-mm-dd

Search enforcements Clear filter

Search Results

We found 0 matches using the following search criteria:
Accountable Party: "1273927 Alberta"
Action: All
Date range: Not specified

Search completed on 1/5/2024

Legend: Act codes and names

Act code	Act name

Action: All
Date range: Not specified

Search completed on 1/5/2024

Expand all +

Collapse all −

Marathon Canada Limited

Action Description: Administrative Penalty

Issue/Decision Date (M/D/Y): 8/14/2000

Penalty: $1,000.00

Municipality/Legal Land Description:
Vulcan County
5-17-17-W4

Act Name:
AEPEA 213(e)

Summary: The company failed to file the Annual Air Emissions Summary and Evaluation report by 15 March 2000 for the Badger gas plant. Penalty paid 10 October 2000.

Marathon Canada Limited

Action Description: Administrative Penalty

Issue/Decision Date (M/D/Y): 2/18/1999

Penalty: $1,500.00

Municipality/Legal Land Description:
Kneehill County
33-30-24-W4

Act Name:
AEPEA 213(e)

Summary: Company failed to submit the 1997 annual process wastewater report within the timeframe specified in the approval to operate the Twining sour gas plant; paid 01-MAR-1999.

Marathon Canada Limited

Action Description: Administrative Penalty

Act Name:

Action Description: Administrative Penalty

Issue/Decision Date (M/D/Y): 2/18/1999

Penalty: $1,500.00

Municipality/Legal Land Description:
Kneehill County
33-30-24-W4

Act Name:
AEPEA 213(e)

Summary: Company failed to submit the 1997 annual process wastewater report within the timeframe specified in the approval to operate the Twining sour gas plant; paid 01-MAR-1999.

Marathon Canada Limited

Action Description: Administrative Penalty

Issue/Decision Date (M/D/Y): 2/18/1999

Penalty: $9,500.00

Municipality/Legal Land Description:
Vulcan County
5-17-17-W4

Act Name:
AEPEA 213(e)

Summary: Company failed to submit several 1997 and 1998 monthly air emission reports, the 1997 annual air emissions summary, and the 1997 annual wastewater and runoff summary reports within the timeframe specified in the approval to operate the Badger sour gas plant; paid 01-MAR-1999.

All search fields are optional.

Accountable Party Marathon

Action All

From (mm/dd/yyyy) yyyy-mm-dd

To (mm/dd/yyyy) yyyy-mm-dd

Search enforcements Clear filter

Search Results

We found 3 matches using the following search criteria:
Accountable Party: "Marathon"
Action: All
Date range: Not specified

Search completed on 1/5/2024

Expand all + **Collapse all** −

Marathon Canada Limited

Action Description: Administrative Penalty

Issue/Decision Date (M/D/Y): 8/14/2000

Penalty: $1,000.00

Municipality/Legal Land Description:
Vulcan County
5-17-17-W4

Act Name:
AEPEA 213(e)

Summary: The company failed to file the Annual Air Emissions Summary and Evaluation report by 15 March 2000 for the Badger gas plant. Penalty paid 10 October 2000.

All search fields are optional.

Accountable Party

Marathon

Action

All

From (mm/dd/yyyy)

yyyy-mm-dd

To (mm/dd/yyyy)

yyyy-mm-dd

Search enforcements Clear filter

Search Results

We found 3 matches using the following search criteria:
Accountable Party: "Marathon"
Action: All
Date range: Not specified

Search completed on 1/5/2024

Expand all + **Collapse all** −

Marathon Canada Limited

Marathon Canada Limited

Marathon Canada Limited

All search fields are optional.

Accountable Party Neufield

Action All

From (mm/dd/yyyy) yyyy-mm-dd

To (mm/dd/yyyy) yyyy-mm-dd

Search enforcements Clear filter

Search Results

We found 0 matches using the following search criteria:
Accountable Party: "Neufield"
Action: All
Date range: Not specified

Search completed on 1/5/2024

Legend: Act codes and names

Act code	Act name
ACA	Agricultural Chemicals Act
AEPEA, AEPEA(R)	Environmental Protection and Enhancement
BCA	Beverage Container Act
CAA	Clean Air Act

Search enforcements

All search fields are optional.

Accountable Party

Olds Golf

Action

All

From (mm/dd/yyyy)

yyyy-mm-dd

To (mm/dd/yyyy)

yyyy-mm-dd

Search enforcements Clear filter

Search Results

We found 0 matches using the following search criteria:

Accountable Party: "Olds Golf"

Action: All

Date range: Not specified

Search completed on 1/5/2024

Search Results

We found 1 matches using the following search criteria:
Accountable Party: "Repsol"
Action: All
Date range: Not specified

Search completed on 1/5/2024

Expand all + **Collapse all** −

Repsol Oil & Gas Canada Inc.

Action Description: Compliance Order

Issue/Decision Date (M/D/Y): 11/24/2022

Municipality/Legal Land Description:
Calgary

Act Name:
EMCRA 133/2019; 12(1)
EMCRA 133/2019; 15(1)
EMCRA 133/2019; 15(4)

Summary: The Party is the holder of Approval no. 277-03-00 for the Edson Gas Plant [the "Site"]. The Site had direct emissions of 100,000 tonnes expressed on a CO2e basis, or more in 2016 or a subsequent year, which means the Site is subject to the Technology Innovation and Emissions Reduction Regulation. An unverified compliance report indicated that the Site's total regulated emissions for 2021 was 189,289 tonnes, expressed on a CO2e basis, which exceeded the Site's allowable emissions for 2021 by 75,454 tonnes of CO2e, which is referred to as the true-up obligation. The Party shall submit a verified compliance report and demonstrate that the Net Emissions do not exceed the Allowable Emissions for 2021 by December 02, 2022; meet the total true-up obligation based on the verified compliance report, and; shall not use an emission offset or emission performance credit to meet the true up obligation, unless the emission offset or emission performance credit was held by them on or before June 30, 2022. Order complied with, file closed.

All search fields are optional.

Accountable Party | **Action** | **From (mm/dd/yyyy)** | **To (mm/dd/yyyy)**

Repsol | All | yyyy-mm-dd | yyyy-mm-dd

Search enforcements Clear filter

Search Results

We found 1 matches using the following search criteria:
Accountable Party: "Repsol"
Action: All
Date range: Not specified

Search completed on 1/5/2024

Expand all + **Collapse all** −

Repsol Oil & Gas Canada Inc.

Action Description: Compliance Order

Issue/Decision Date (M/D/Y): 11/24/2022

Municipality/Legal Land Description:
Calgary

Act Name:
EMCRA 133/2019; 12(1)
EMCRA 133/2019; 15(1)
EMCRA 133/2019; 15(4)

Summary: The Party is the holder of Approval no. 277-03-00 for the Edson Gas Plant [the "Site"]. The Site had direct emissions of 100,000 tonnes expressed on a CO2e basis, or more in 2016 or a subsequent year, which means the Site is subject to the Technology Innovation and Emissions Reduction Regulation. An unverified compliance report

Search Results

We found 2 matches using the following search criteria:
Accountable Party: "Richardson Bros"
Action: All
Date range: Not specified

Search completed on 1/5/2024

Expand all + **Collapse all** −

Richardson Bros (Olds) Limited

Action Description: Administrative Penalty

Issue/Decision Date (M/D/Y): 5/12/2020

Penalty: $4,500.00

Municipality/Legal Land Description:
Vulcan County
SE-9-14-20-W4

Act Name:
PLA 20(1)

Summary: The Party entered onto and occupied public land for the purposes of excavating and stockpiling rock, without authorization. Penalty paid October 28, 2020.

Richardson Bros (Olds) Limited

Search Results

We found 2 matches using the following search criteria:
Accountable Party: "Richardson Bros"
Action: All
Date range: Not specified

Search completed on 1/5/2024

Expand all +

Collapse all −

Richardson Bros (Olds) Limited

Action Description: Administrative Penalty

Issue/Decision Date (M/D/Y): 5/12/2020

Penalty: $4,500.00

Municipality/Legal Land Description:
Vulcan County
SE-9-14-20-W4

Act Name:
PLA 20(1)

Summary: The Party entered onto and occupied public land for the purposes of excavating and stockpiling rock, without authorization. Penalty paid October 28, 2020.

Richardson Bros (Olds) Limited

Action Description: Warning Letter

Issue/Decision Date (M/D/Y): 1/13/2020

Municipality/Legal Land Description:
Red Deer County
E-5-36-28-W4

Act Name:
AEPEA(R) 61

Summary: The Party conducted an unauthorized activity, the operation of a gravel pit without a valid registration. Compliance has since been achieved through the issuance of Registration No. 409406-00-00 under the Code of Practice for Pits.

Search Results

We found 2 matches using the following search criteria:
Accountable Party: "Richardson Bros"
Action: All
Date range: Not specified

Search completed on 1/5/2024

Expand all + **Collapse all** −

Richardson Bros (Olds) Limited

Richardson Bros (Olds) Limited

Legend: Act codes and names

Act code	Act name
ACA	Agricultural Chemicals Act
AEPEA, AEPEA(R)	Environmental Protection and Enhancement
BCA	Beverage Container Act
CAA	Clean Air Act

APPENDIX J

AER Compliance Dashboard

Bifröst

Environmental and Remediation Services Inc.

APPENDIX J1

AER – HEES

Bifröst

Environmental and Remediation Services Inc.

- a reportable release of hydrocarbon or produced water that migrates off lease or on pipeline right-of-ways; or
- a seismic event of local magnitude (M_L) 4.0 or greater in the Duvernay Zone (subject to Subsurface Order No. 2) or 2.5 M_L or greater in the Brazeau area (subject to Subsurface Order No. 6) or 3.0 M_L or greater in the Red Deer area (subject to Subsurface Order No. 7).

The AER is committed to protecting public safety and the environment, and it monitors and responds to energy-related incidents 24 hours a day, 7 days a week. The AER has staff trained in emergency response, environmental protection, air quality, and investigation. These staff assist, coordinate, and support the activities of the responsible operator, as well as the local municipal authority and other provincial and federal responders to ensure a coordinated, effective response and that requirements are followed.

Data last updated 1/5/2024, 10:40:29 AM Mountain Time

Show 10 **entries** **Search:** 1273927 Alberta Print Save

Reference No.	Incident Date	Company	Location	Operation Type	Product	Status
No matching records found						
Search Refere	Search Incide	Search Company	Search Locati	Search Operat	Search Product	Search Status

Showing 0 to 0 of 0 entries (filtered from 2,625 total entries) Previous Next

Expand/Collapse All Clear Filters

- a reportable release of hydrocarbon or produced water that migrates off lease or on pipeline right-of-ways; or
- a seismic event of local magnitude (M_L) 4.0 or greater in the Duvernay Zone (subject to Subsurface Order No. 2) or 2.5 M_L or greater in the Brazeau area (subject to Subsurface Order No. 6) or 3.0 M_L or greater in the Red Deer area (subject to Subsurface Order No. 7).

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Data last updated 1/5/2024, 10:40:29 AM Mountain Time

Show 10 **entries** **Search:** Marathon Print Save

Reference No.	Incident Date	Company	Location	Operation Type	Product	Status
No matching records found						
Search Refere	Search Incide	Search Company	Search Locati	Search Operat	Search Product	Search Status

Showing 0 to 0 of 0 entries (filtered from 2,625 total entries) Previous Next

Expand/Collapse All Clear Filters

- a reportable release of hydrocarbon or produced water that migrates off lease or on pipeline right-of-ways; or
- a seismic event of local magnitude (M_L) 4.0 or greater in the Duvernay Zone (subject to Subsurface Order No. 2) or 2.5 M_L or greater in the Brazeau area (subject to Subsurface Order No. 6) or 3.0 M_L or greater in the Red Deer area (subject to Subsurface Order No. 7).

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Data last updated 1/5/2024, 10:40:29 AM Mountain Time

Show 10 **entries** **Search:** Neufield Print Save

Reference No.	Incident Date	Company	Location	Operation Type	Product	Status
No matching records found						
Search Refere	Search Incide	Search Company	Search Locati	Search Operat	Search Product	Search Status

Showing 0 to 0 of 0 entries (filtered from 2,625 total entries) Previous Next

Expand/Collapse All Clear Filters

- a reportable release of hydrocarbon or produced water that migrates off lease or on pipeline right-of-ways; or
- a seismic event of local magnitude (M_L) 4.0 or greater in the Duvernay Zone (subject to Subsurface Order No. 2) or 2.5 M_L or greater in the Brazeau area (subject to Subsurface Order No. 6) or 3.0 M_L or greater in the Red Deer area (subject to Subsurface Order No. 7).

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Data last updated 1/5/2024, 10:40:29 AM Mountain Time

Show 10 **entries** **Search:** Olds Golf Print Save

Reference No.	Incident Date	Company	Location	Operation Type	Product	Status
No matching records found						
Search Refere	Search Incide	Search Company	Search Locati	Search Operat	Search Product	Search Status

Showing 0 to 0 of 0 entries (filtered from 2,625 total entries) Previous Next

Expand/Collapse All Clear Filters

Show 10 entries

Search: Repsol Print Save

	Reference No.	Incident Date	Company	Location	Operation Type	Product	Status
	20230821	2023-04-09	Repsol Oil & Gas Canada Inc.	Edson (13 km W)	Pipeline	H_2S; Gas Prod'n (Mrktble);	No Emergency Phase.
	20221480	2022-06-27	Repsol Oil & Gas Canada Inc.	Wainwright (31 km SE)	Pipeline	Emulsion	No Emergency Phase.
	20220320	2022-02-01	Repsol Oil & Gas Canada Inc.	Chauvin (2 km E)	Well	H_2S; Crude Oil; Salt/Produced Water;	No emergency phase.
	20211529	2021-07-08	Repsol Oil & Gas Canada Inc.	Wainwright (53 km SE)	Well	Emulsion	No emergency phase.
	20210510	2021-03-03	Repsol Oil & Gas Canada Inc.	Edson (12 km SW)	Pipeline	Gas Production (Raw)	No emergency phase.
	20210305	2021-02-09	Repsol Oil & Gas Canada Inc.	Edson (9 km SW)	Pipeline	Gas Production (Raw)	No emergency phase.
	20202920	2020-12-18	Repsol Oil & Gas Canada Inc.	Grande Cache (60 km NE)	Pipeline	H_2S	No emergency phase.
	20202834	2020-12-05	Repsol Oil & Gas Canada Inc.	Fox Creek (65 km SW)	Pipeline	Gas Production (Raw)	No emergency phase.
	20202270	2020-09-24	Repsol Oil & Gas Canada Inc.	Chauvin (3 km SW)	Pipeline	Salt/Produced Water	No emergency phase.
	20202219	2020-09-19	Repsol Oil & Gas Canada Inc.	Chauvin (11 km S)	Well	Crude Oil and Salt/Produced Water	No emergency phase.
	Search Refere	Search Incide	Search Company	Search Locati	Search Operat	Search Product	Search Status

Showing 1 to 10 of 34 entries (filtered from 2,625 total entries)

Previous 1 2 3 4 Next

Expand/Collapse All Clear Filters

Show 10 entries

Search: Repsol Print Save

	Reference No.	Incident Date	Company	Location	Operation Type	Product	Status
	20200631	2020-03-10	Repsol Oil & Gas Canada Inc.	Ribstone (5 km SE)	Well	Crude Oil and Salt/Produced Water	No emergency phase.
	20193335	2019-11-07	Repsol Oil & Gas Canada Inc.	Edson (14 km W)	Pipeline	Condensate	No emergency phase.
	20192741	2019-09-14	Repsol Oil & Gas Canada Inc.	Edson (7 km E)	Pipeline	Condensate and Produced Water Emulsion	Emergency phase over.
	20192724	2019-09-12	Repsol Oil & Gas Canada Inc.	Chauvin (7 km E)	Well	Crude Oil	No emergency phase.
	20192461	2019-08-17	Repsol Oil & Gas Canada Inc.	Consort (18 km E)	Well	Crude Oil and Salt/Produced Water	No emergency phase.
	20192037	2019-07-07	Repsol Oil & Gas Canada Inc.	Chauvin (6 km NE)	Facility	Contam.Surface Water	No emergency phase.
	20190383	2019-02-06	Repsol Oil & Gas Canada Inc.	Edson (13 km W)	Well	Crude Oil	No emergency phase.
	20190077	2019-01-07	Repsol Oil & Gas Canada Inc.	Chauvin (9 km SW)	Well	Crude Oil and Salt/Produced Water	No emergency phase.
	20183872	2018-12-28	Repsol Oil & Gas Canada Inc.	Ribstone (7 km SE)	Pipeline	Salt/Produced Water	No emergency phase
	20183408	2018-11-06	Repsol Oil & Gas Canada Inc.	Consort (30 km N)	Facility	Crude Oil	no emergency phase
	Search Refere	Search Incide	Search Company	Search Locati	Search Operat	Search Product	Search Status

Showing 11 to 20 of 34 entries (filtered from 2,625 total entries)

Previous 1 2 3 4 Next

Expand/Collapse All Clear Filters

Show 10 entries

Search: Repsol Print Save

	Reference No.	Incident Date	Company	Location	Operation Type	Product	Status
	20173026	2017-09-25	Repsol Oil & Gas Canada Inc.	Edson (8 km SW)	Well	Gas Production (Raw)	No emergency phase.
	20172516	2017-08-08	Repsol Oil & Gas Canada Inc.	Ribstone (9 km SE)	Well	Salt/Produced Water	No emergency phase.
	20172365	2017-07-24	Repsol Oil & Gas Canada Inc.	Chauvin (10.5 km SW)	Facility	Crude Oil	No Emergency Phase
	20171440	2017-05-04	Repsol Oil & Gas Canada Inc.	Wainwright (45 km SE)	Pipeline	Salt/Produced Water	No emergency phase.
	20171441	2017-05-04	Repsol Oil & Gas Canada Inc.	Wainwright (45 km SE)	Pipeline	Salt/Produced Water	No emergency phase.
	20163161	2016-10-26	Repsol Oil & Gas Canada Inc.	Edgerton (3 km NW)	Pipeline	Crude Oil	No emergency phase
	20163033	2016-10-15	Repsol Oil & Gas Canada Inc.	Chauvin (1 km SW)	Facility	Crude Oil and Salt/Produced Water	No emergency phase
	20162107	2016-07-30	Repsol Oil & Gas Canada Inc.	Chauvin (7 km NE)	Pipeline	Crude Oil and Salt/Produced Water	No emergency phase.
	20162047	2016-07-24	Repsol Oil & Gas Canada Inc.	Edson (57 km S)	Pipeline	H_2S	No emergency phase.
	20162035	2016-07-21	Repsol Oil & Gas Canada Inc.	Edson (8 km S)	Pipeline	Gas Production (Raw)	No emergency phase.
	Search Refere	Search Incide	Search Company	Search Locati	Search Operat	Search Product	Search Status

Showing 21 to 30 of 34 entries (filtered from 2,625 total entries)

Previous 1 2 3 4 Next

Expand/Collapse All Clear Filters

Show 10 entries

Search: Repsol Print Save

	Reference No.	Incident Date	Company	Location	Operation Type	Product	Status
	20160923	2016-04-01	Repsol Oil & Gas Canada Inc.	Wainwright (23 km E)	Pipeline	Crude Oil and Salt/Produced Water	No emergency phase.
	20160741	2016-03-14	Repsol Oil & Gas Canada Inc.	Hinton (46 km N)	Pipeline	Gas Production (Raw)	No emergency phase.
	IS101	2016-01-12	Repsol Oil & Gas Inc.	Fox Creek (32 km W)	Well	N/A	No emergency phase.
	20160065	2016-01-08	Repsol Oil and Gas Inc.	Marlboro (28 km NW)	Pipeline	H_2S	Emergency phase over.
	Search Refere	Search Incide	Search Company	Search Locati	Search Operat	Search Product	Search Status

Showing 31 to 34 of 34 entries (filtered from 2,625 total entries)

Previous 1 2 3 4 Next

Expand/Collapse All Clear Filters

- a reportable release of hydrocarbon or produced water that migrates off lease or on pipeline right-of-ways; or
- a seismic event of local magnitude (M_L) 4.0 or greater in the Duvernay Zone (subject to Subsurface Order No. 2) or 2.5 M_L or greater in the Brazeau area (subject to Subsurface Order No. 6) or 3.0 M_L or greater in the Red Deer area (subject to Subsurface Order No. 7).

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Data last updated 1/5/2024, 10:40:29 AM Mountain Time

Show 10 **entries** **Search:** Richardson Bros Print Save

Reference No.	Incident Date	Company	Location	Operation Type	Product	Status
No matching records found						
Search Refere	Search Incide	Search Company	Search Locati	Search Operat	Search Product	Search Status

Showing 0 to 0 of 0 entries (filtered from 2,625 total entries) Previous Next

Expand/Collapse All Clear Filters

APPENDIX J2

AER – Investigations

Bifröst

Environmental and Remediation Services Inc.

issuing enforcement action if the AER determines that the responsible parties demonstrated due diligence by making a reasonable effort to follow all rules, regulations, and requirements or if the investigation is inconclusive (there was insufficient evidence).

The status will be listed as phase 1, 2, 3, or closed as the investigation progresses. Phase 1 is when AER staff collect information and conduct a site and incident assessment. Phase 2 involves the analysis of the materials collected. Phase 3 includes the final file review and enforcement response decision. The investigation tab will be updated on a monthly basis.

Archived investigation reports can be found on our website.

Data last updated 1/5/2024, 10:40:53 AM Mountain Time

Show 10 **entries** **Search:** 1273927 Alberta Print Save

Reference No.	Company	Date	Operation Type	Location	Status
No matching records found					
Search Reference	Search Company	Search Date	Search Operation	Search Location	Search Status

Showing 0 to 0 of 0 entries (filtered from 232 total entries) Previous Next

Expand/Collapse All Clear Filters

issuing enforcement action if the AER determines that the responsible parties demonstrated due diligence by making a reasonable effort to follow all rules, regulations, and requirements or if the investigation is inconclusive (there was insufficient evidence).

The status will be listed as phase 1, 2, 3, or closed as the investigation progresses. Phase 1 is when AER staff collect information and conduct a site and incident assessment. Phase 2 involves the analysis of the materials collected. Phase 3 includes the final file review and enforcement response decision. The investigation tab will be updated on a monthly basis.

Archived investigation reports can be found on our website.

Data last updated 1/5/2024, 10:40:53 AM Mountain Time

Show 10 **entries** **Search:** Marathon Print Save

Reference No.	Company	Date	Operation Type	Location	Status
No matching records found					
Search Reference	Search Company	Search Date	Search Operation	Search Location	Search Status

Showing 0 to 0 of 0 entries (filtered from 232 total entries) Previous Next

Expand/Collapse All Clear Filters

issuing enforcement action if the AER determines that the responsible parties demonstrated due diligence by making a reasonable effort to follow all rules, regulations, and requirements or if the investigation is inconclusive (there was insufficient evidence).

The status will be listed as phase 1, 2, 3, or closed as the investigation progresses. Phase 1 is when AER staff collect information and conduct a site and incident assessment. Phase 2 involves the analysis of the materials collected. Phase 3 includes the final file review and enforcement response decision. The investigation tab will be updated on a monthly basis.

Archived investigation reports can be found on our website.

Data last updated 1/5/2024, 10:40:53 AM Mountain Time

Show 10 **entries** **Search:** Neufield Print Save

Reference No.	Company	Date	Operation Type	Location	Status
No matching records found					
Search Reference	Search Company	Search Date	Search Operation	Search Location	Search Status

Showing 0 to 0 of 0 entries (filtered from 232 total entries) Previous Next

Expand/Collapse All Clear Filters

issuing enforcement action if the AER determines that the responsible parties demonstrated due diligence by making a reasonable effort to follow all rules, regulations, and requirements or if the investigation is inconclusive (there was insufficient evidence).

The status will be listed as phase 1, 2, 3, or closed as the investigation progresses. Phase 1 is when AER staff collect information and conduct a site and incident assessment. Phase 2 involves the analysis of the materials collected. Phase 3 includes the final file review and enforcement response decision. The investigation tab will be updated on a monthly basis.

Archived investigation reports can be found on our website.

Data last updated 1/5/2024, 10:40:53 AM Mountain Time

Show 10 **entries** **Search:** Olds Golf Print Save

Reference No.	Company	Date	Operation Type	Location	Status
No matching records found					
Search Reference	Search Company	Search Date	Search Operation	Search Location	Search Status

Showing 0 to 0 of 0 entries (filtered from 232 total entries) Previous Next

Expand/Collapse All Clear Filters

issuing enforcement action if the AER determines that the responsible parties demonstrated due diligence by making a reasonable effort to follow all rules, regulations, and requirements or if the investigation is inconclusive (there was insufficient evidence).

The status will be listed as phase 1, 2, 3, or closed as the investigation progresses. Phase 1 is when AER staff collect information and conduct a site and incident assessment. Phase 2 involves the analysis of the materials collected. Phase 3 includes the final file review and enforcement response decision. The investigation tab will be updated on a monthly basis.

Archived investigation reports can be found on our website.

Data last updated 1/5/2024, 10:40:53 AM Mountain Time

Show 10 entries

Search: Repsol Print Save

Reference No.	Company	Date	Operation Type	Location	Status
No matching records found					
Search Reference	Search Company	Search Date	Search Operation	Search Location	Search Status

Showing 0 to 0 of 0 entries (filtered from 232 total entries) Previous Next

Expand/Collapse All Clear Filters

issuing enforcement action if the AER determines that the responsible parties demonstrated due diligence by making a reasonable effort to follow all rules, regulations, and requirements or if the investigation is inconclusive (there was insufficient evidence).

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Archived investigation reports can be found on our website.

Data last updated 1/5/2024, 10:40:53 AM Mountain Time

Show 10 **entries** **Search:** Richardson Bros Print Save

Reference No.	Company	Date	Operation Type	Location	Status
No matching records found					
Search Reference	Search Company	Search Date	Search Operation	Search Location	Search Status

Showing 0 to 0 of 0 entries (filtered from 232 total entries) Previous Next

Expand/Collapse All Clear Filters

Reference No.	Company	AER Response	Description	Date
202109-15	Repsol Oil & Gas Canada Inc.	Decision to Cancel	Failure to meet reclamation criteria.	2021-09-29
202001-17	Repsol Oil & Gas Canada Inc.	Decision to Cancel	Failure to meet reclamation criteria.	2020-01-29
201901-82	Repsol Oil & Gas Canada Inc.	Notice of Noncompliance Pipelines	Licensee responsible for a ground disturbance did not keep all pipeline warning signs or markers visible and legible for the duration of the ground disturbance or did not replace or relocate them if necessary. An existing pipeline within 5 m of a proposed ground disturbance was not located by hand excavation, or the hand excavation procedures are not acceptable to the licensee of the pipeline. Mechanical excavation equipment used within 600 mm of a pipeline, or within any distance beneath a pipeline, is not under the direct supervision of a representative of the licensee of the existing pipeline.	2019-01-17
201901-75	Repsol Oil & Gas Canada Inc.	Decision to Cancel	Failure to meet reclamation criteria.	2019-01-14
201701-20	Repsol Oil & Gas Canada Inc.	Notice of Noncompliance Pipelines	Licensee is not able to demonstrate that procedures in the manuals have been implemented, or it is not operating and maintaining its pipeline systems in accordance with documented procedures.	2017-01-31
201605-35	Repsol Oil & Gas Canada Inc.	Notice of Noncompliance Pipelines	Licensee does not immediately notify the AER of a pipeline leak, a break, a test failure, or contact damage by telephoning the appropriate AER field centre.	2016-05-31
201604-25	Repsol Oil & Gas Canada Inc.	Notice of Noncompliance Pipelines	Licensee does not have a manual containing procedures for pipeline operation, corrosion control, integrity management, maintenance and repair, or does not provide the manuals to the AER upon request. Licensee is not able to demonstrate that procedures in the manuals have been implemented, or it is not operating and maintaining its pipeline systems in accordance with documented procedures. An engineering assessment was not conducted to define the pipeline operating conditions and closure parameters of the emergency shutdown devices, or a record of the current assessment not maintained. Failure to carry out the notification requirements within the EPZ.	2016-04-05
201410-24	Repsol Oil & Gas Canada Inc.	Notice of Noncompliance Pipelines	Care is not taken in the handling, transporting, stockpiling, and placing of pipe and components to prevent damage to the pipe, coating, and any lining.	2014-10-17
Search Refere	Search Company	Search AER Re	Search Description	Search Da

APPENDIX J3

AER – Enforcement

Bifröst

Environmental and Remediation Services Inc.

Noncompliance & Enforcement

The noncompliance and enforcement tab replaces ST108 – AER Monthly Enforcement Action Summary and contains information starting from July 2014. New noncompliance or enforcement responses will be posted here within two business days of the AER issuing the response.

The responses reported here include the following:

- enforcement decisions, such as warning letters, administrative penalties, and prosecution;
- administrative sanctions (e.g., imposition of terms and conditions);
- directions of an inspector in relation to section 137(2)(c) of the *Environmental Protection and Enhancement Act*;
- orders issued to compel compliance or remediate;
- any notice of noncompliance that is related to a full or partial suspension of operations;
- suspension or cancellation of an approval; and
- cancellation of a reclamation certificate.

Compliance orders issued before July 2014 are available under the Index of AER Orders.

The Compliance Dashboard summarizes data collected at different points in time and does not necessarily represent the most current information available. This summary should not be relied upon by any person intending to deal with the company or any property, assets, or interests of the company. This information is provided without warranty of any kind, and the AER disclaims any liability for losses or damages resulting from the use of or reliance on this information.

Data last updated 1/5/2024, 10:47:35 AM Mountain Time

Show 10 **entries** **Search:** 1273927 Alberta Print Save

Reference No.	Company	AER Response	Description	Date
No matching records found				
Search Refere	Search Company	Search AER Re	Search Description	Search Da

Showing 0 to 0 of 0 entries (filtered from 3,619 total entries) Previous Next

Expand/Collapse All Clear Filters

Noncompliance & Enforcement

The noncompliance and enforcement tab replaces ST108 – AER Monthly Enforcement Action Summary and contains information starting from July 2014. New noncompliance or enforcement responses will be posted here within two business days of the AER issuing the response.

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- directions of an inspector in relation to section 137(2)(c) of the *Environmental Protection and Enhancement Act*;
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Data last updated 1/5/2024, 10:47:35 AM Mountain Time

Show 10 **entries** **Search:** Marathon Print Save

Reference No.	Company	AER Response	Description	Date
No matching records found				
Search Refere	Search Company	Search AER Re	Search Description	Search Da

Showing 0 to 0 of 0 entries (filtered from 3,619 total entries) Previous Next

Expand/Collapse All Clear Filters

Noncompliance & Enforcement

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- administrative sanctions (e.g., imposition of terms and conditions);
- directions of an inspector in relation to section 137(2)(c) of the *Environmental Protection and Enhancement Act*;
- orders issued to compel compliance or remediate;
- any notice of noncompliance that is related to a full or partial suspension of operations;
- suspension or cancellation of an approval; and
- cancellation of a reclamation certificate.

Compliance orders issued before July 2014 are available under the Index of AER Orders.

The Compliance Dashboard summarizes data collected at different points in time and does not necessarily represent the most current information available. This summary should not be relied upon by any person intending to deal with the company or any property, assets, or interests of the company. This information is provided without warranty of any kind, and the AER disclaims any liability for losses or damages resulting from the use of or reliance on this information.

Data last updated 1/5/2024, 10:47:35 AM Mountain Time

Show 10 **entries** **Search:** Neufield Print Save

Reference No.	Company	AER Response	Description	Date
No matching records found				
Search Refere	Search Company	Search AER Re	Search Description	Search Da

Showing 0 to 0 of 0 entries (filtered from 3,619 total entries) Previous Next

Expand/Collapse All Clear Filters

Noncompliance & Enforcement

The noncompliance and enforcement tab replaces ST108 – AER Monthly Enforcement Action Summary and contains information starting from July 2014. New noncompliance or enforcement responses will be posted here within two business days of the AER issuing the response.

The responses reported here include the following:

- enforcement decisions, such as warning letters, administrative penalties, and prosecution;
- administrative sanctions (e.g., imposition of terms and conditions);
- directions of an inspector in relation to section 137(2)(c) of the *Environmental Protection and Enhancement Act*;
- orders issued to compel compliance or remediate;
- any notice of noncompliance that is related to a full or partial suspension of operations;
- suspension or cancellation of an approval; and
- cancellation of a reclamation certificate.

Compliance orders issued before July 2014 are available under the Index of AER Orders.

The Compliance Dashboard summarizes data collected at different points in time and does not necessarily represent the most current information available. This summary should not be relied upon by any person intending to deal with the company or any property, assets, or interests of the company. This information is provided without warranty of any kind, and the AER disclaims any liability for losses or damages resulting from the use of or reliance on this information.

Data last updated 1/5/2024, 10:47:35 AM Mountain Time

Show 10 **entries** **Search:** Olds Golf Print Save

Reference No.	Company	AER Response	Description	Date
No matching records found				
Search Refere	Search Company	Search AER Re	Search Description	Search Da

Showing 0 to 0 of 0 entries (filtered from 3,619 total entries) Previous Next

Expand/Collapse All Clear Filters

Data last updated 1/5/2024, 10:47:35 AM Mountain Time

Show 10 entries

Search: Repsol Print Save

Reference No.	Company	AER Response	Description	Date
202109-15	Repsol Oil & Gas Canada Inc.	Decision to Cancel	Failure to meet reclamation criteria.	2021-09-29
202001-17	Repsol Oil & Gas Canada Inc.	Decision to Cancel	Failure to meet reclamation criteria.	2020-01-29
201901-82	Repsol Oil & Gas Canada Inc.	Notice of Noncompliance Pipelines	Licensee responsible for a ground disturbance did not keep all pipeline warning signs or markers visible and legible for the duration of the ground disturbance or did not replace or relocate them if necessary. An existing pipeline within 5 m of a proposed ground disturbance was not located by hand excavation, or the hand excavation procedures are not acceptable to the licensee of the pipeline. Mechanical excavation equipment used within 600 mm of a pipeline, or within any distance beneath a pipeline, is not under the direct supervision of a representative of the licensee of the existing pipeline.	2019-01-17
201901-75	Repsol Oil & Gas Canada Inc.	Decision to Cancel	Failure to meet reclamation criteria.	2019-01-14
201701-20	Repsol Oil & Gas Canada Inc.	Notice of Noncompliance Pipelines	Licensee is not able to demonstrate that procedures in the manuals have been implemented, or it is not operating and maintaining its pipeline systems in accordance with documented procedures.	2017-01-31
201605-35	Repsol Oil & Gas Canada Inc.	Notice of Noncompliance Pipelines	Licensee does not immediately notify the AER of a pipeline leak, a break, a test failure, or contact damage by telephoning the appropriate AER field centre.	2016-05-31
201604-25	Repsol Oil & Gas Canada Inc.	Notice of Noncompliance Pipelines	Licensee does not have a manual containing procedures for pipeline operation, corrosion control, integrity management, maintenance and repair, or does not provide the manuals to the AER upon request. Licensee is not able to demonstrate that procedures in the manuals have been implemented, or it is not operating and maintaining its pipeline systems in accordance with documented procedures. An engineering assessment was not conducted to define the pipeline	2016-04-05

- enforcement decisions, such as warning letters, administrative penalties, and prosecution;
- administrative sanctions (e.g., imposition of terms and conditions);
- directions of an inspector in relation to section 137(2)(c) of the *Environmental Protection and Enhancement Act*;
- orders issued to compel compliance or remediate;
- any notice of noncompliance that is related to a full or partial suspension of operations;
- suspension or cancellation of an approval; and
- cancellation of a reclamation certificate.

resulting from the use of or reliance on this information.

Compliance orders issued before July 2014 are available under the Index of AER Orders.

Data last updated 1/5/2024, 10:47:35 AM Mountain Time

Show 10 **entries** **Search:** Richardson Bros Print Save

Reference No.	Company	AER Response	Description	Date
No matching records found				
Search Refere	Search Company	Search AER Re	Search Description	Search Da

Showing 0 to 0 of 0 entries (filtered from 3,619 total entries) Previous Next

Expand/Collapse All Clear Filters

APPENDIX K

FOIP Requests

Bifröst

Environmental and Remediation Services Inc.

No Records

No records were recovered (the category is applicable but the records do not exist), the records were not available (the category is applicable but the records are not available), or the records category was not applicable to this particular Phase I ESA Site.

APPENDIX L

PTMAA/ASCC Correspondence

Bifröst

Environmental and Remediation Services Inc.

No Records

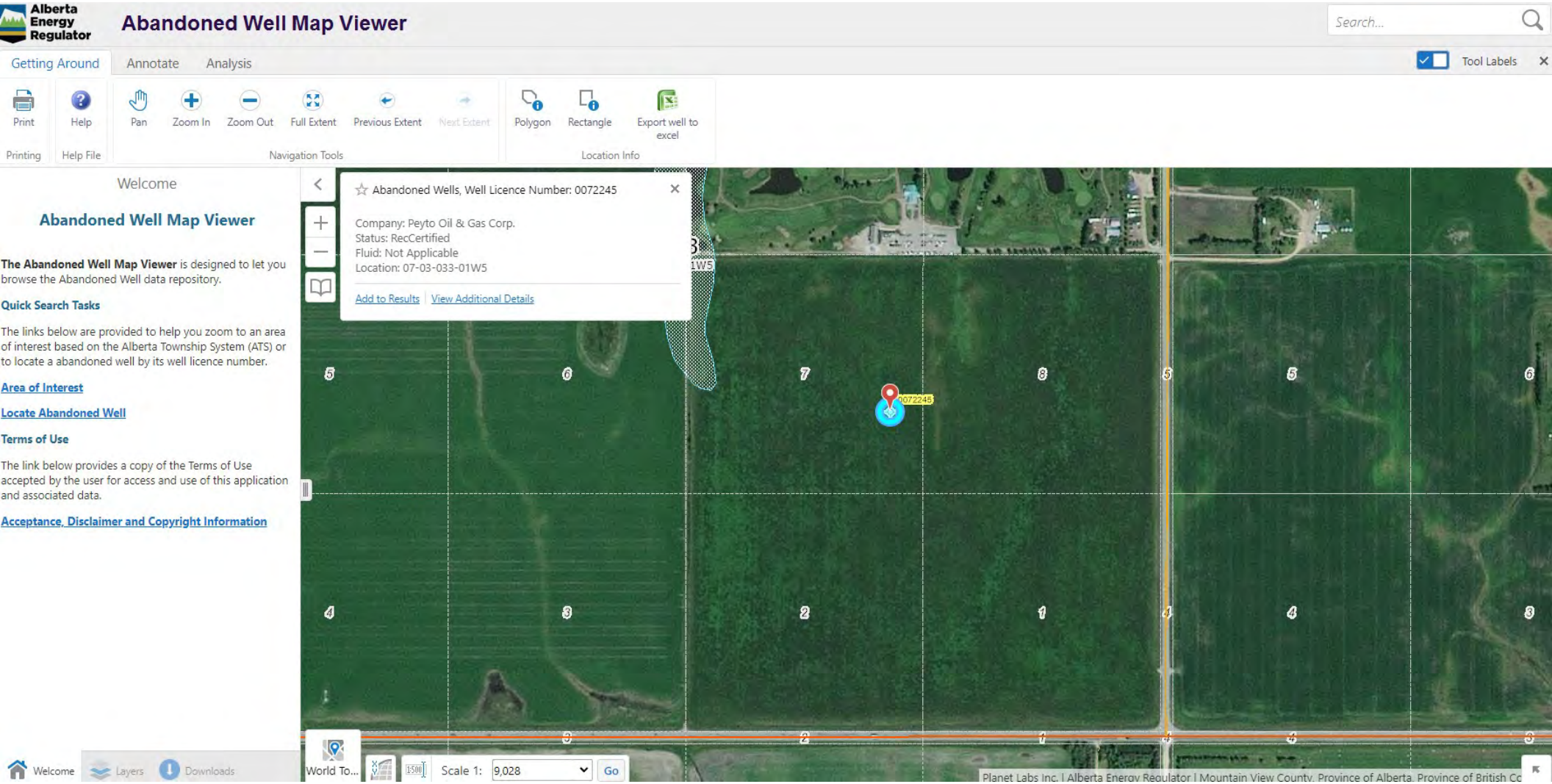
No records were recovered (the category is applicable but the records do not exist), the records were not available (the category is applicable but the records are not available), or the records category was not applicable to this particular Phase I ESA Site.

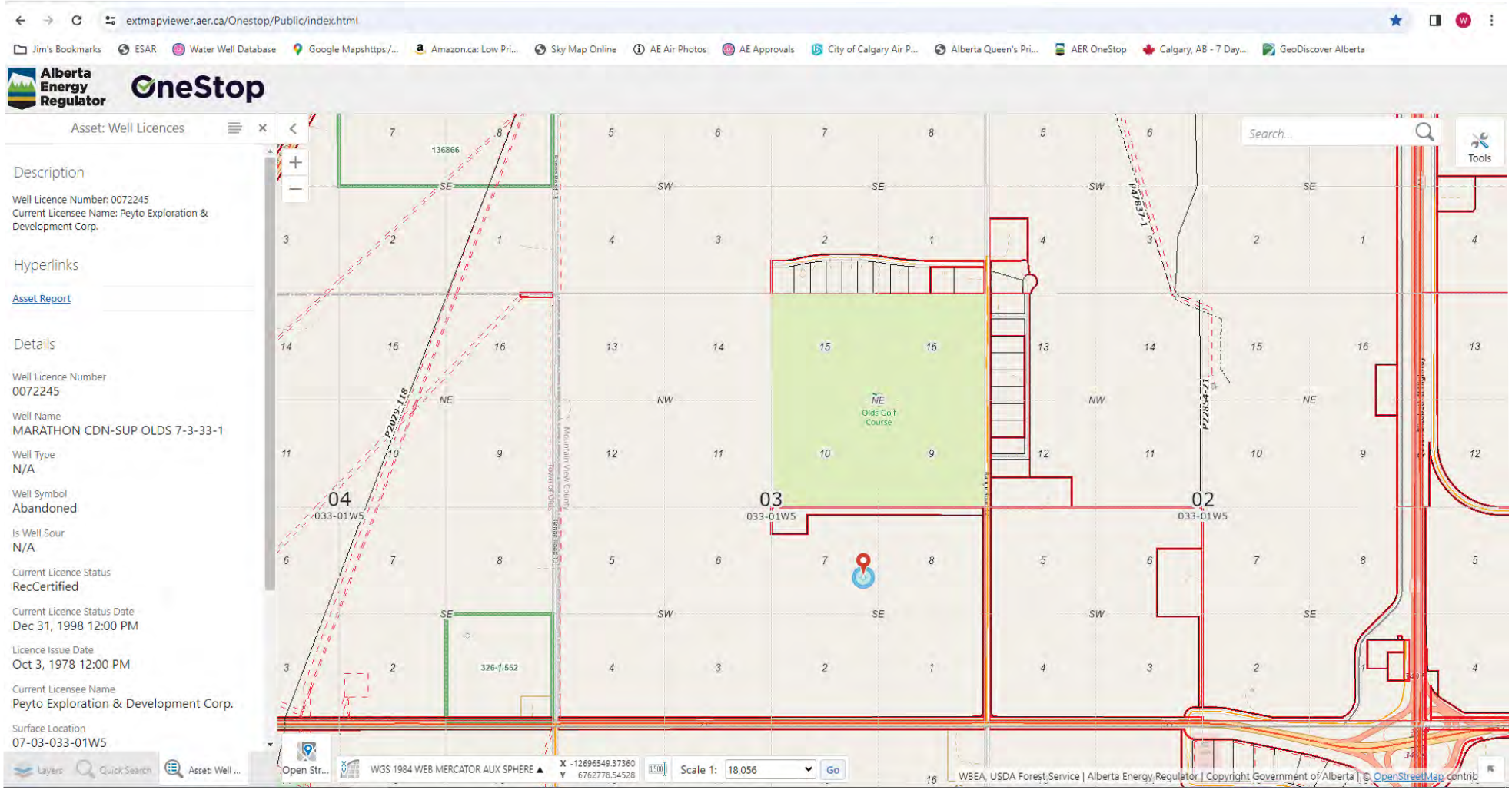
APPENDIX M

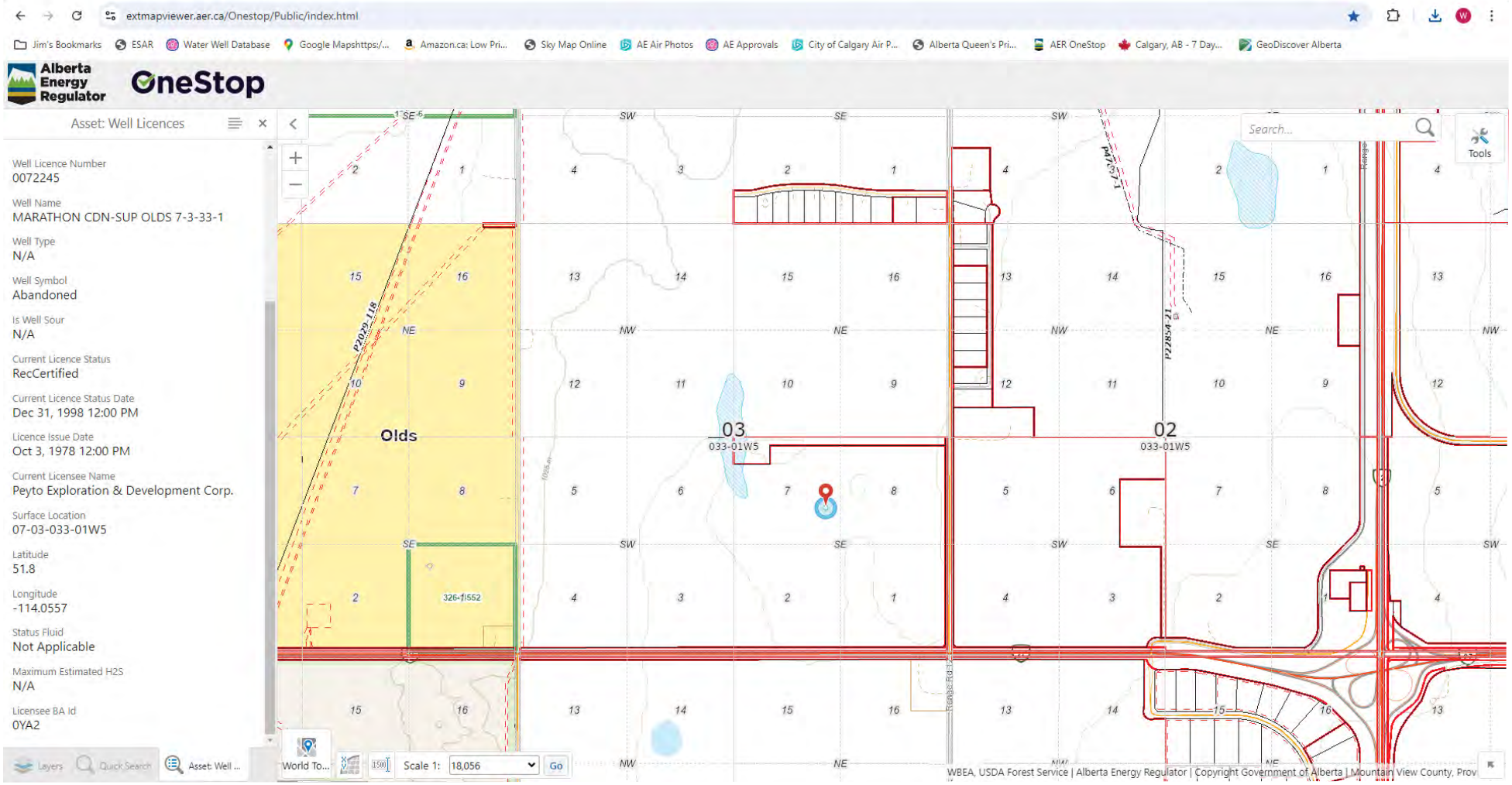
AER Abandoned Well Maps

Bifröst

Environmental and Remediation Services Inc.


Alberta Energy Regulator
Abandoned Well Map Viewer
Search...
Getting Around
Annotate
Analysis
Tool Labels
Print
Help
Pan
Zoom In
Zoom Out
Full Extent
Previous Extent
Next Extent
Polygon
Rectangle
Export well to excel
Printing
Help File
Navigation Tools
Location Info
Welcome
Abandoned Well Map Viewer
The Abandoned Well Map Viewer is designed to let you browse the Abandoned Well data repository.
Quick Search Tasks
The links below are provided to help you zoom to an area of interest based on the Alberta Township System (ATS) or to locate a abandoned well by its well licence number.
Area of Interest
Locate Abandoned Well
Terms of Use
The link below provides a copy of the Terms of Use accepted by the user for access and use of this application and associated data.
Acceptance, Disclaimer and Copyright Information
Abandoned Wells, Well Licence Number: 0072245
Company: Peyto Oil & Gas Corp.
Status: RecCertified
Fluid: Not Applicable
Location: 07-03-033-01W5
Add to Results
View Additional Details
0072245
Welcome
Layers
Downloads
World To...
Scale 1:
9,028
Go
Planet Labs Inc. | Alberta Energy Regulator | Mountain View County, Province of Alberta, Province of British Co


extmapviewer.aer.ca/Onestop/Public/index.html
Alberta Energy Regulator
OneStop
Asset: Well Licences
Description
Well Licence Number: 0072245
Current Licensee Name: Peyto Exploration & Development Corp.
Hyperlinks
Asset Report
Details
Well Licence Number
0072245
Well Name
MARATHON CDN-SUP OLDS 7-3-33-1
Well Type
N/A
Well Symbol
Abandoned
Is Well Sour
N/A
Current Licence Status
RecCertified
Current Licence Status Date
Dec 31, 1998 12:00 PM
Licence Issue Date
Oct 3, 1978 12:00 PM
Current Licensee Name
Peyto Exploration & Development Corp.
Surface Location
07-03-033-01W5
Search...
Tools
Olds Golf Course
04
033-01W5
03
033-01W5
02
033-01W5
WGS 1984 WEB MERCATOR AUX SPHERE
Scale 1: 18,056
Go
WBEA, USDA Forest Service | Alberta Energy Regulator | Copyright Government of Alberta | © OpenStreetMap contrib

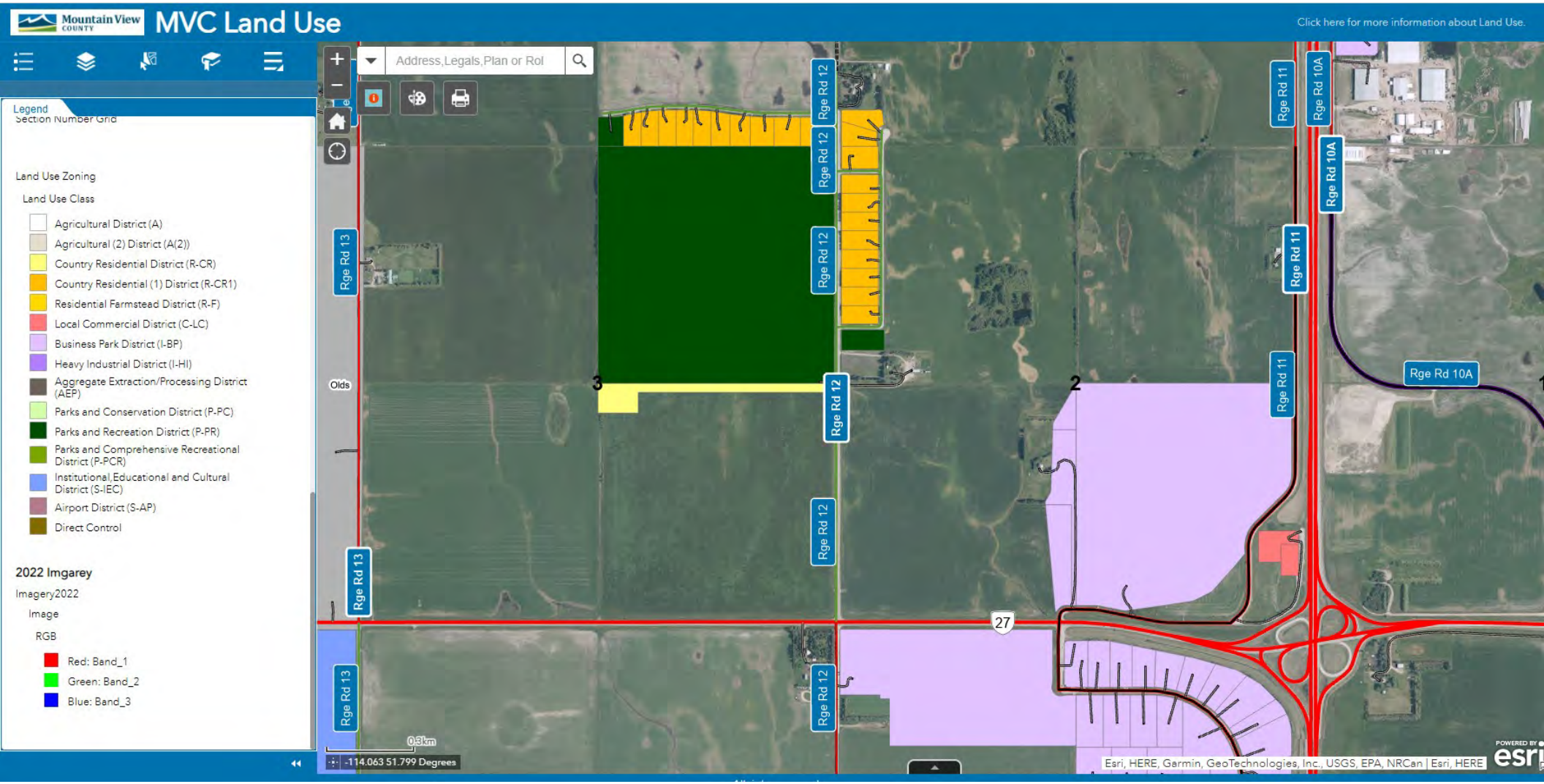

extmapviewer.aer.ca/Onestop/Public/index.html
Alberta Energy Regulator
OneStop
Asset: Well Licences
Well Licence Number
0072245
Well Name
MARATHON CDN-SUP OLDS 7-3-33-1
Well Type
N/A
Well Symbol
Abandoned
Is Well Sour
N/A
Current Licence Status
RecCertified
Current Licence Status Date
Dec 31, 1998 12:00 PM
Licence Issue Date
Oct 3, 1978 12:00 PM
Current Licensee Name
Peyto Exploration & Development Corp.
Surface Location
07-03-033-01W5
Latitude
51.8
Longitude
-114.0557
Status Fluid
Not Applicable
Maximum Estimated H2S
N/A
Licensee BA Id
0YA2
Olds
03
033-01W5
02
033-01W5
Search...
Tools
Scale 1: 18,056
Go
WBEA, USDA Forest Service | Alberta Energy Regulator | Copyright Government of Alberta | Mountain View County, Prov

APPENDIX N

Land Use

Bifröst

Environmental and Remediation Services Inc.


Mountain View COUNTY
MVC Land Use
Click here for more information about Land Use.
Address,Legals,Plan or Rol
Legend
Section Number Grid
Land Use Zoning
Land Use Class
Agricultural District (A)
Agricultural (2) District (A(2))
Country Residential District (R-CR)
Country Residential (1) District (R-CR1)
Residential Farmstead District (R-F)
Local Commercial District (C-LC)
Business Park District (I-BP)
Heavy Industrial District (I-HI)
Aggregate Extraction/Processing District (AEP)
Parks and Conservation District (P-PC)
Parks and Recreation District (P-PR)
Parks and Comprehensive Recreational District (P-PCR)
Institutional,Educational and Cultural District (S-IEC)
Airport District (S-AP)
Direct Control
2022 Imgarey
Imagery2022
Image
RGB
Red: Band_1
Green: Band_2
Blue: Band_3
Rge Rd 13
Rge Rd 12
Rge Rd 11
Rge Rd 10A
Olds
3
2
27
0.3km
-114.063 51.799 Degrees
Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, EPA, NRCan | Esri, HERE
POWERED BY esri

APPENDIX O

ERIS Physical Setting Report

Bifröst

Environmental and Remediation Services Inc.

PSR
PHYSICAL SETTING REPORT

Property Information

Order Number:		23111700859p
Date Completed:		November 22, 2023
Project Number:		2023061
Project Property:		1273927 Alberta Ltd. SE-3-33-1W5M Olds AB
Coordinates:		
	Latitude:	51.79878881
	Longitude:	-114.05484618
	UTM Northing:	5742762.38003 Metres
	UTM Easting:	703070.669594 Metres
	UTM Zone:	UTM Zone 11U
	Elevation:	1,020.00 m
	Slope Direction:	W

Property Information....1
Topographic Information....2
Hydrologic Information....12
Geologic Information....13
Soil Information....17
Wells and Additional Sources....29
Report Summary....31
Detail Report....33
Radon Information....51
Appendix....52
Liability Notice....55

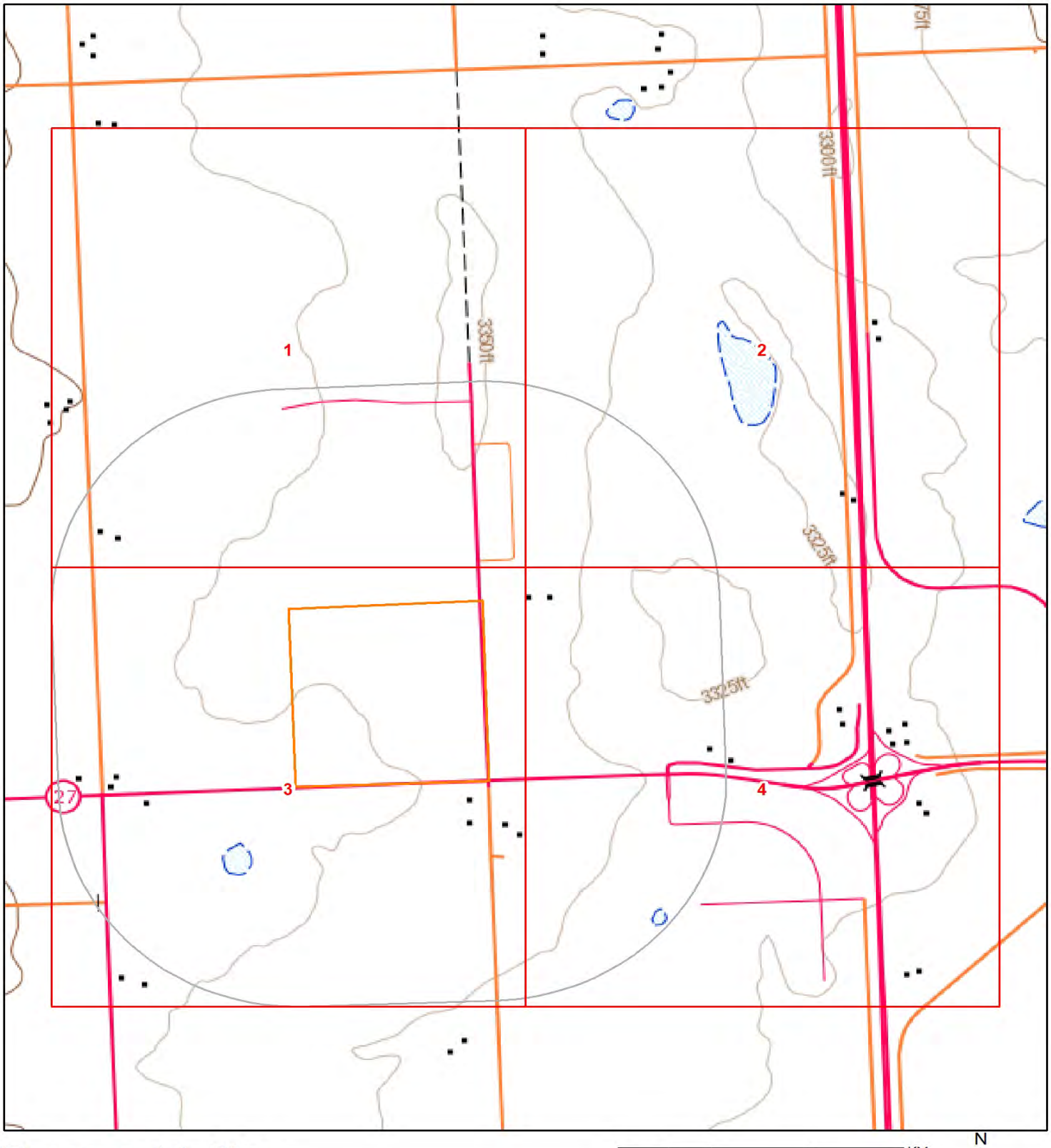
The ERIS ***Physical Setting Report - PSR*** provides comprehensive information about the physical setting around a site and includes a complete overview of topography as well as hydrologic, geologic and soil characteristics. The location and detailed attributes of oil and gas wells, water wells, and radon are also included for review.

The compilation of both physical characteristics of a site and additional attribute data is useful in assessing the impact of migration of contaminants and subsequent impact on soils and groundwater.

Disclaimer

This Report does not provide a full environmental evaluation for the site or adjacent properties. Please see the terms and disclaimer at the end of the Report for greater detail.

Topographic Information



Topographic Map

0.4 0.2 0 0.4 0.8 KM

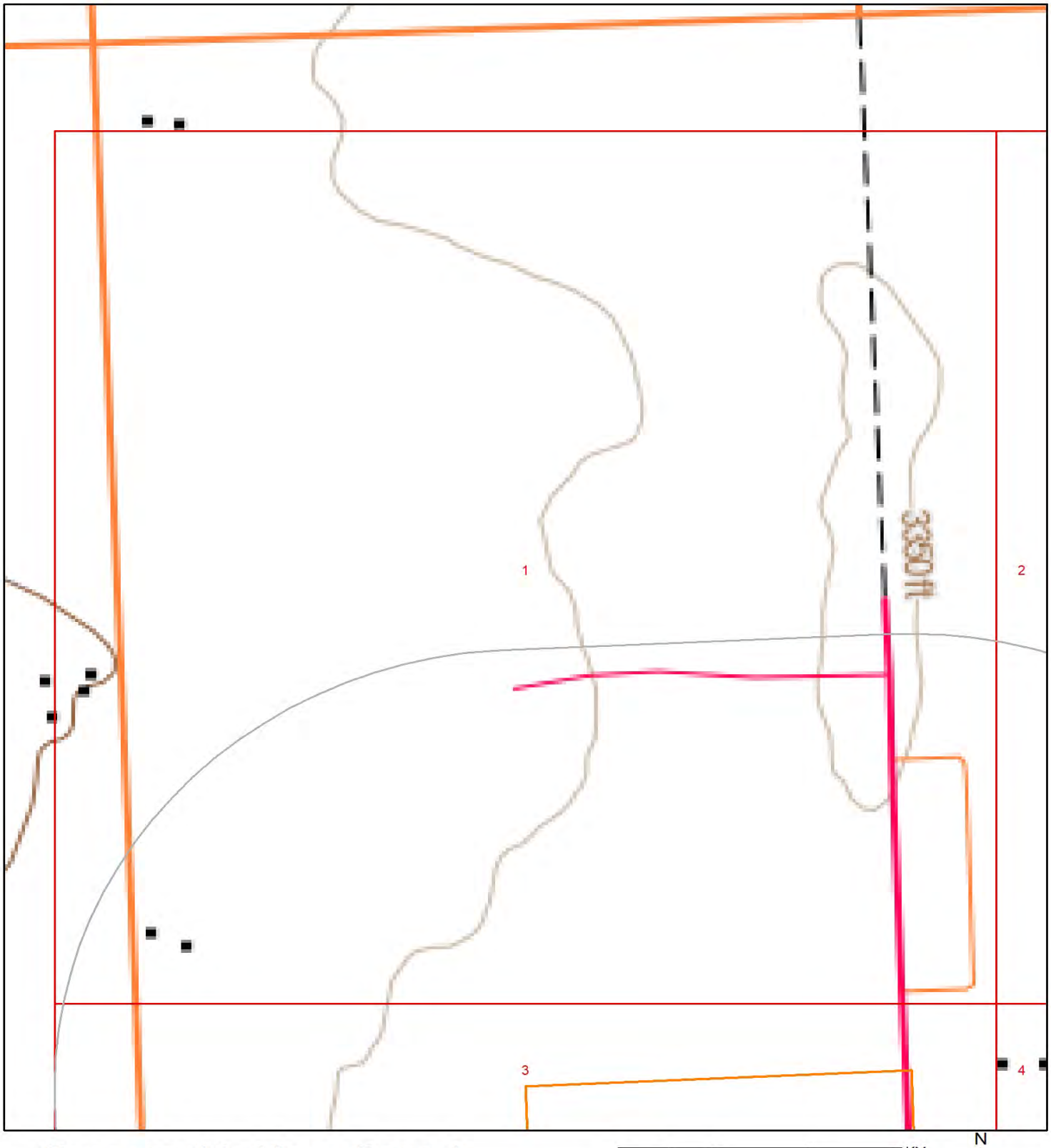
N

Address: SE-3-33-1W5M,Olds,AB

Data source: Toporama (1:50K) by Natural Resource Canada. Publication date: 2013-07-19
Legend available at ftp://ftp.geogratis.gc.ca/pub/nrcan_rncan/raster/toporama/doc/Toporama_en_Legend.pdf

ERIS

Topographic Information

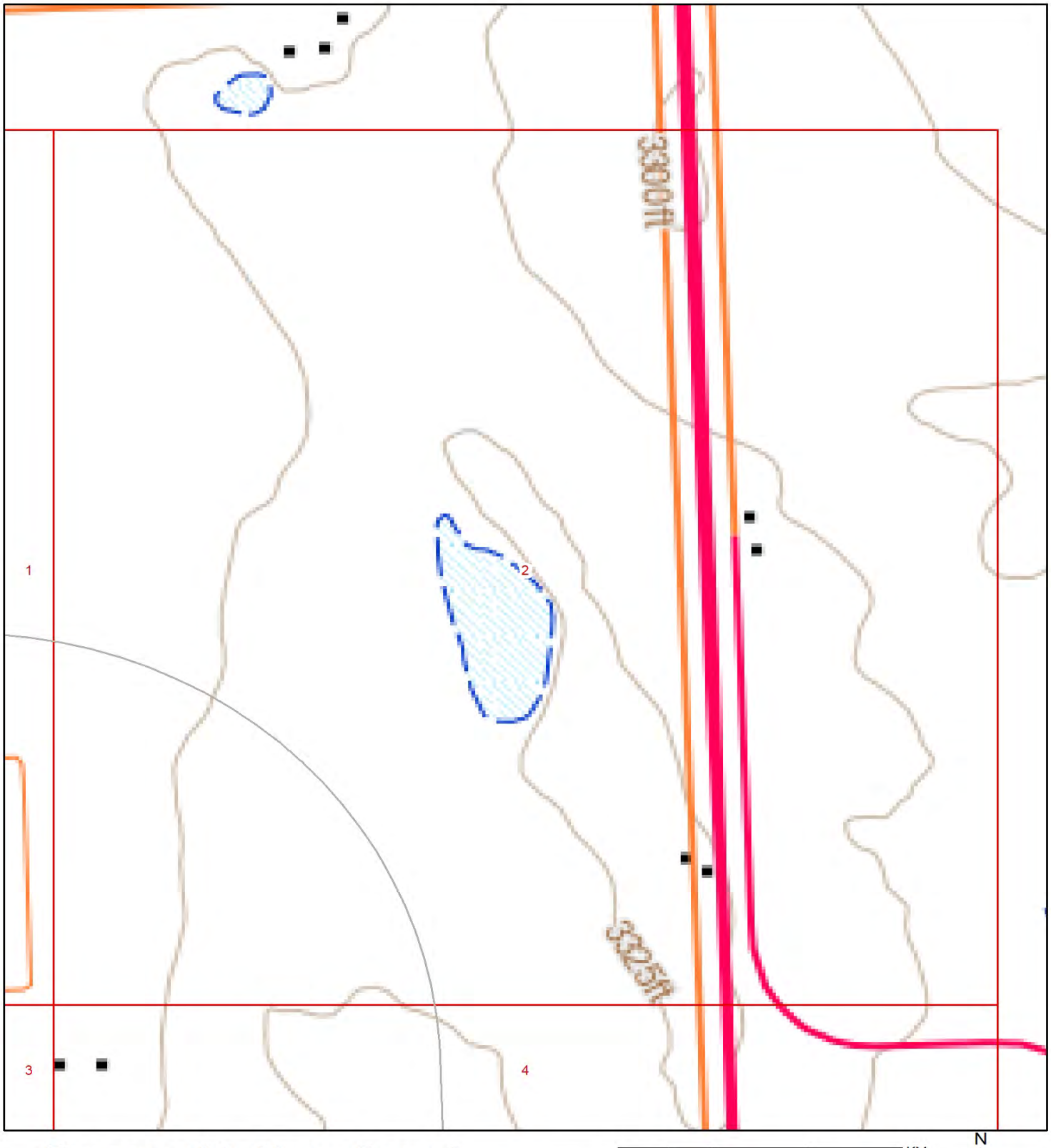


Topographic Map - Page 1

Data source: Toporama (1:50K) by Natural Resource Canada.

ERIS

Topographic Information



Topographic Map - Page 2

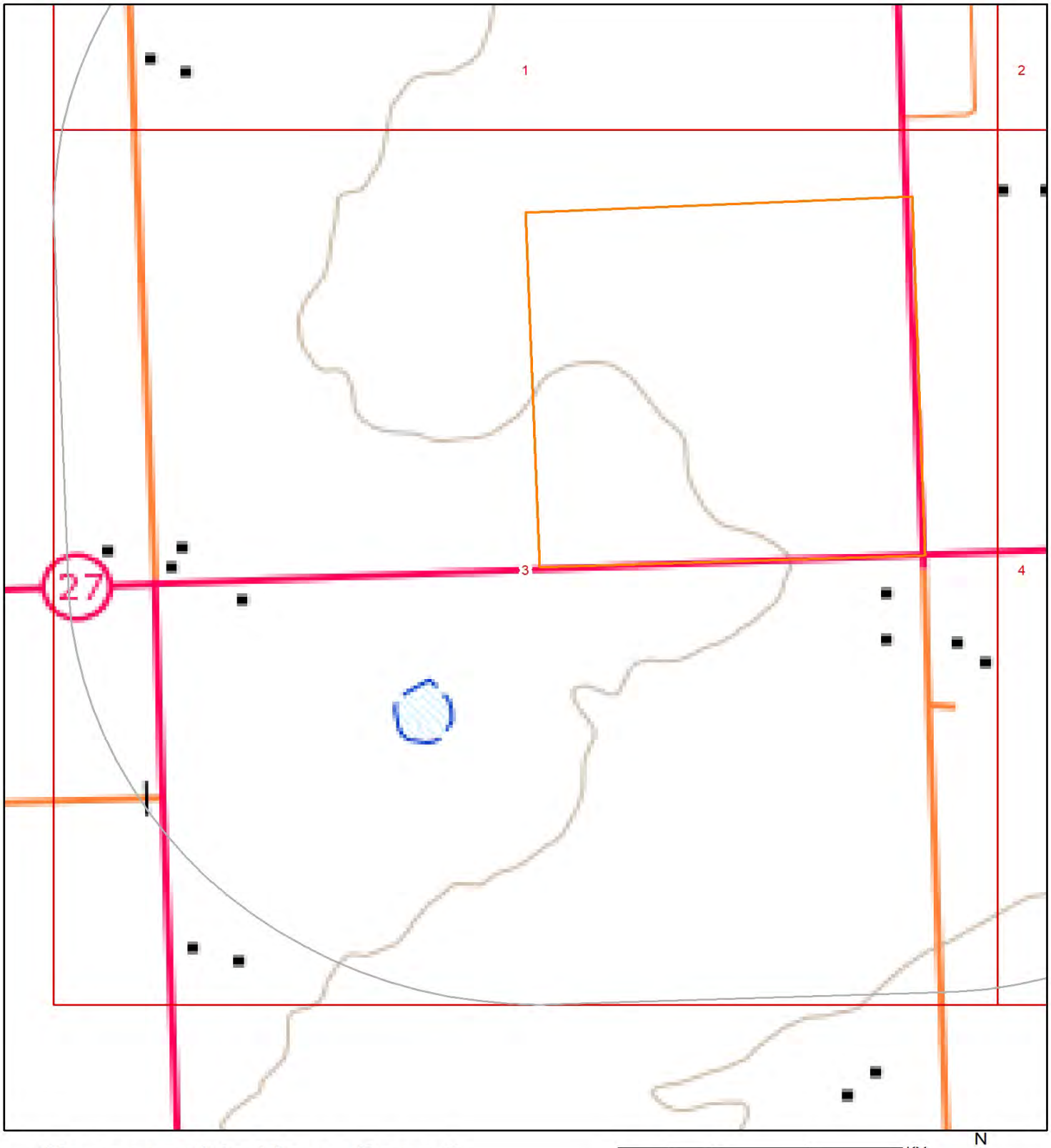
0.2 0.1 0 0.2 0.4 KM

N

Data source: Toporama (1:50K) by Natural Resource Canada.

ERIS

Topographic Information



Topographic Map - Page 3

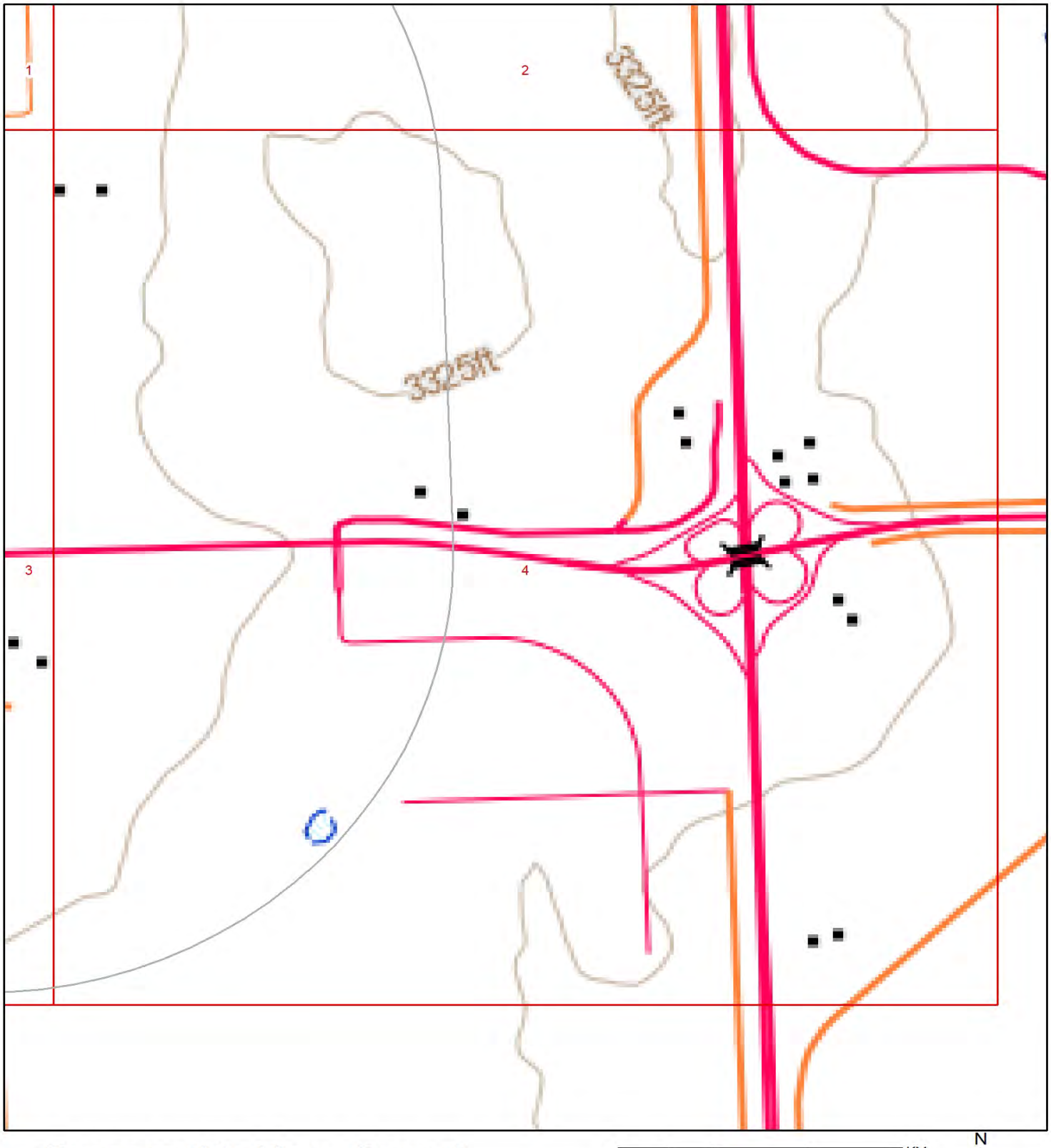
0.2 0.1 0 0.2 0.4 KM

N

Data source: Toporama (1:50K) by Natural Resource Canada.

ERIS

Topographic Information



Topographic Map - Page 4

0.2 0.1 0 0.2 0.4 KM

N

Data source: Toporama (1:50K) by Natural Resource Canada.

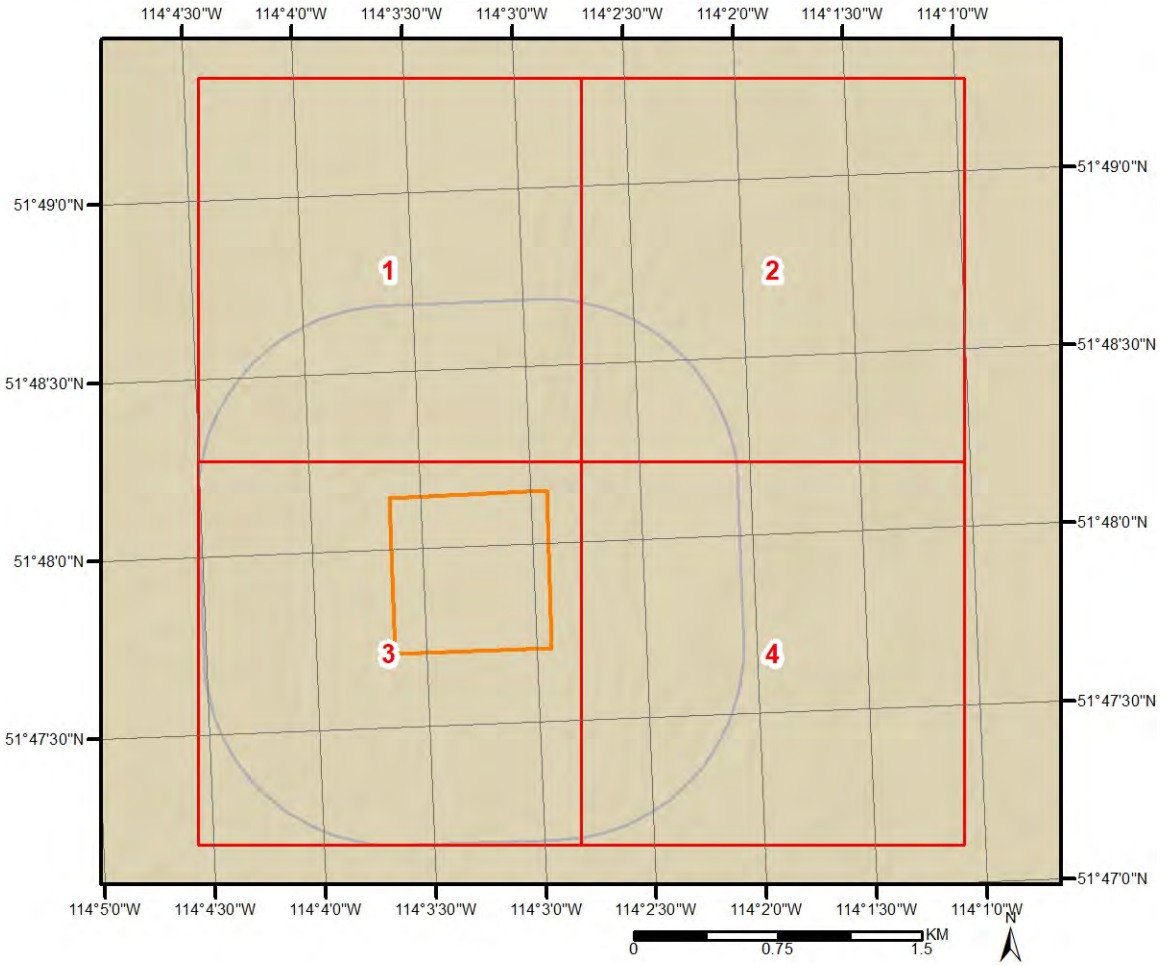
ERIS

Topographic Information

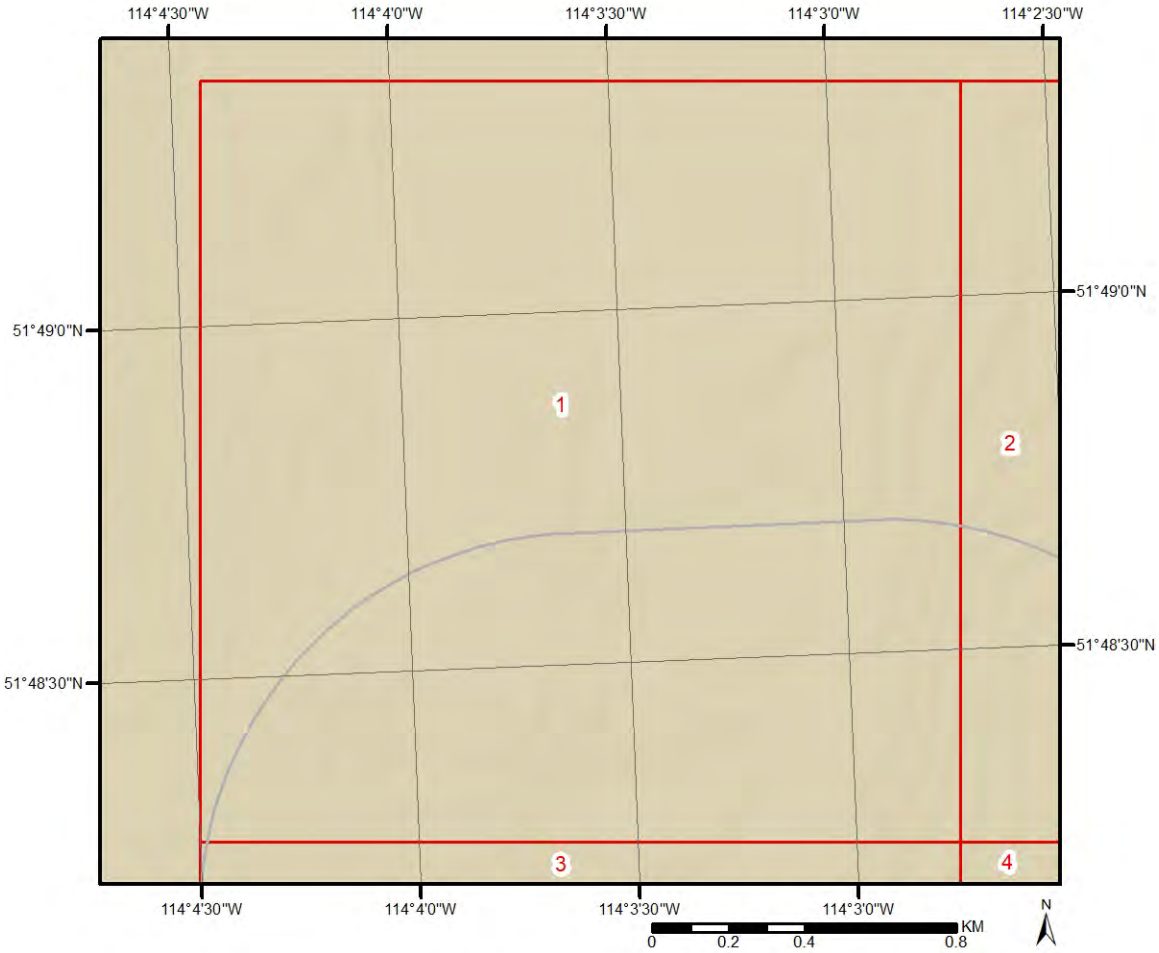
The previous topographic map(s) show general topographic information in the surrounding area of the project property, using Toporama data or a provincial source when available. Below are shaded relief map(s), derived from Digital Elevation data to depict terrain in further detail.

Topographic information at project property:

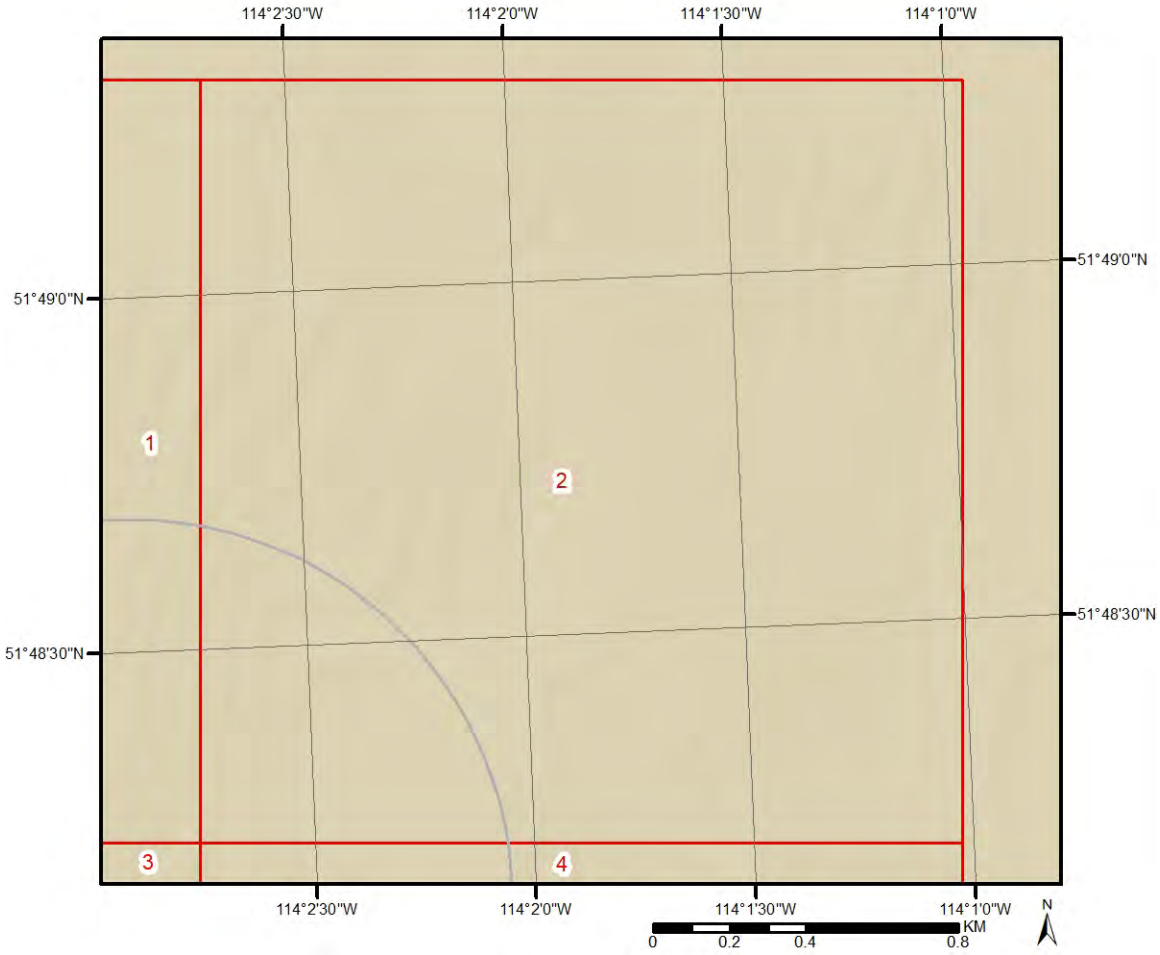
Elevation:	1,020.00 m
Slope Direction:	W



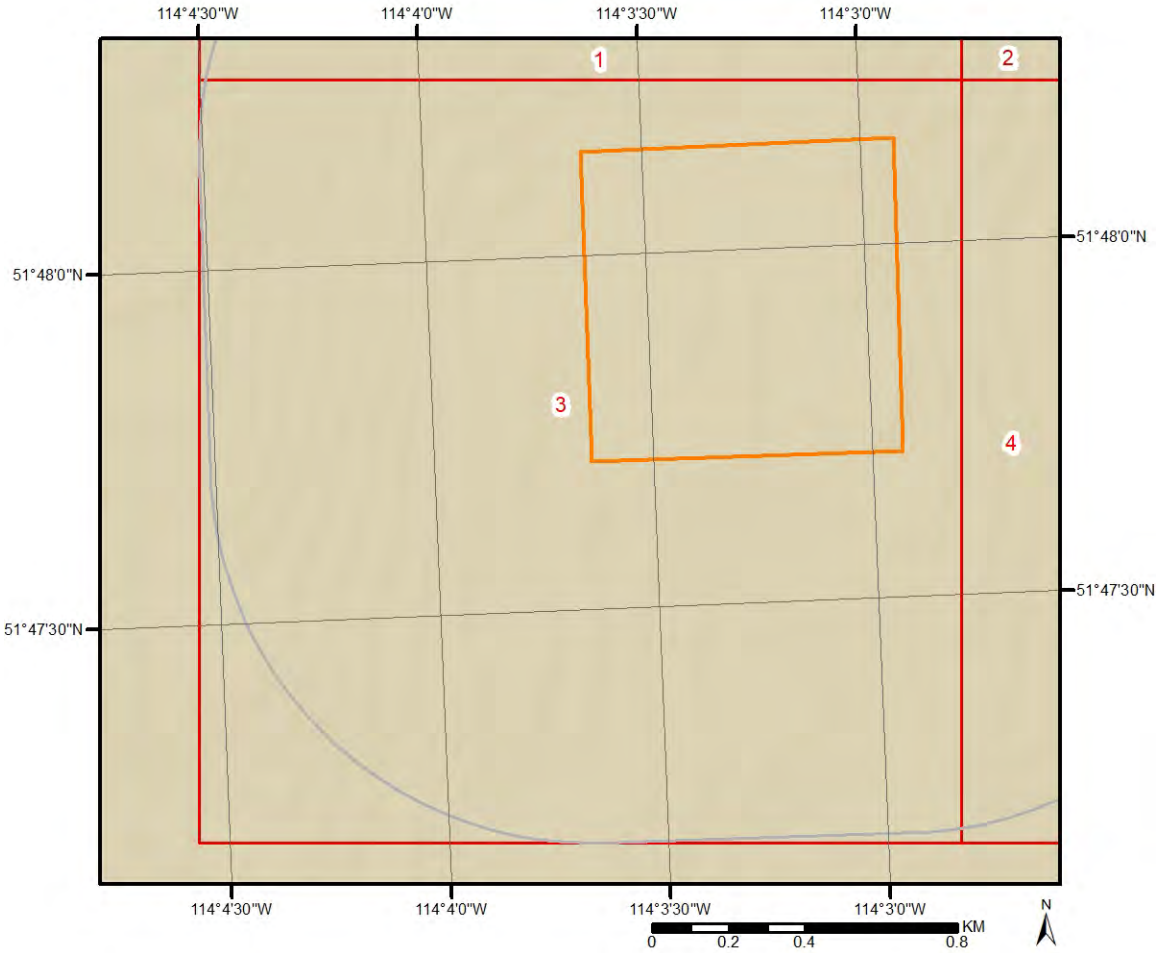
Topographic Information



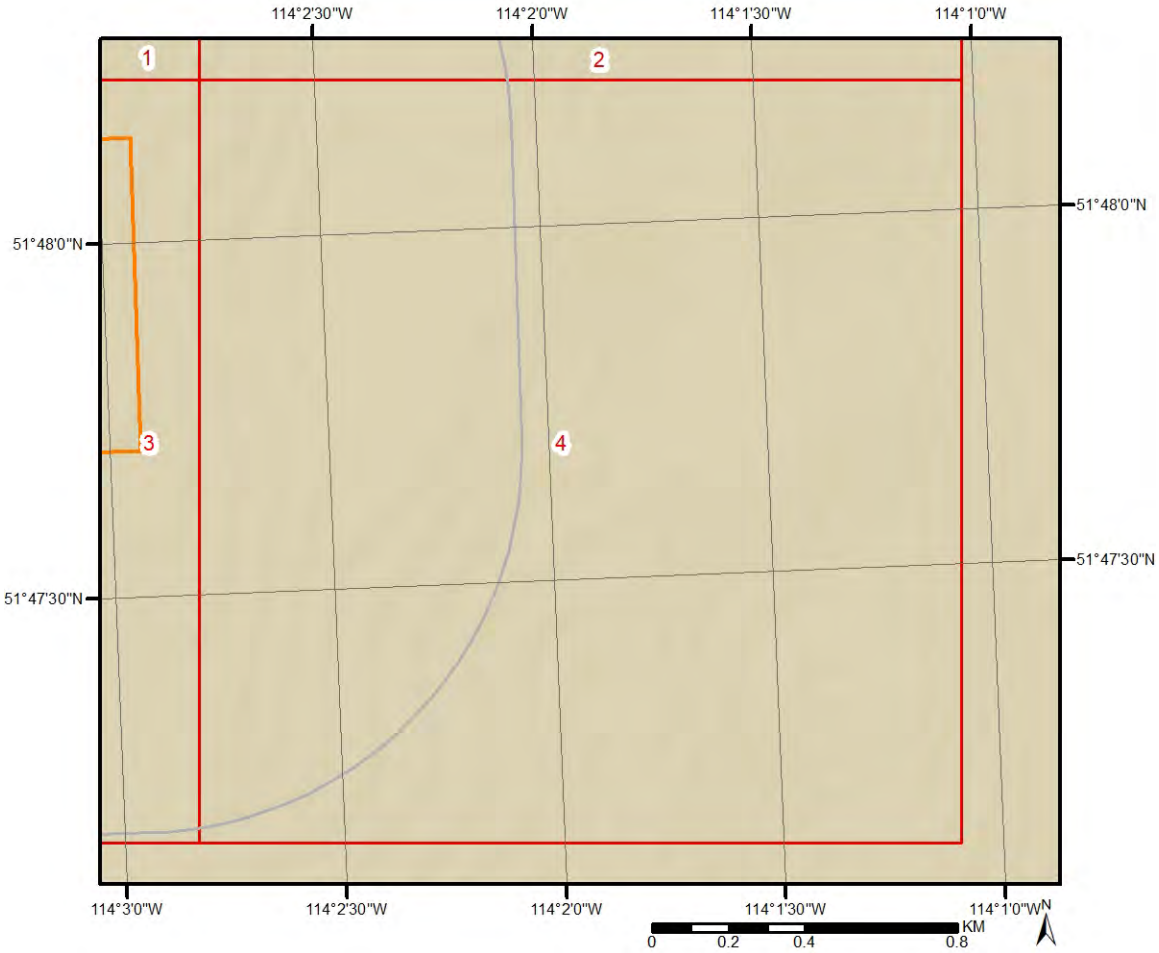
Topographic Information



Topographic Information



Topographic Information



Hydrologic Information



Wetland

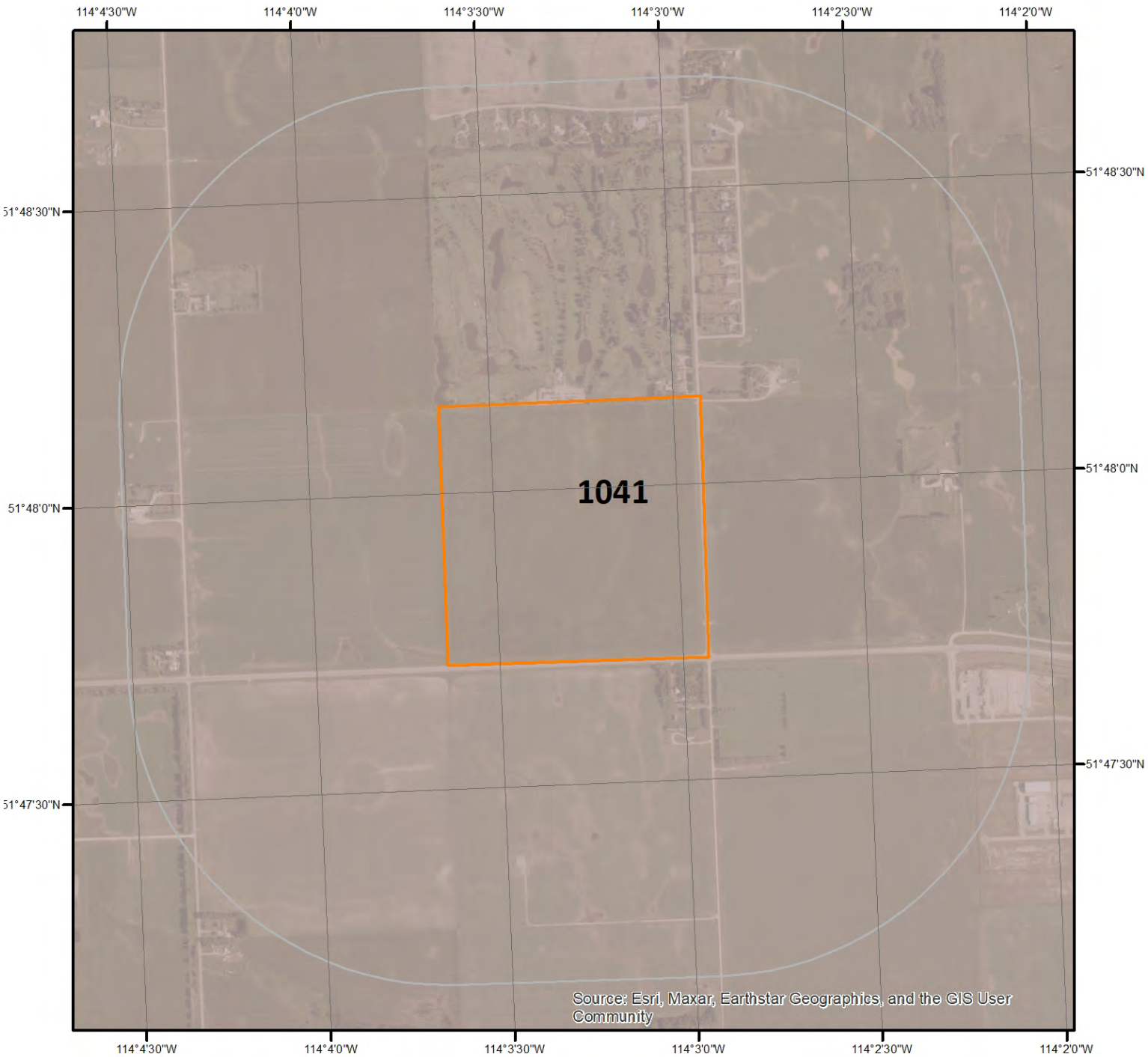
This map shows wetland existence. Data coverage is shown to the right.
Gray indicates no data available in the area.

KM
0 0.175 0.35 0.7 1.05

N

Marsh

Geologic Information

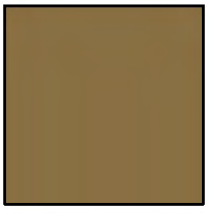


Bedrock Geology

0 0.2 0.4 0.8 KM

N

This map shows bedrock geologic units in the area. Please refer to the report for detailed descriptions. Data coverage is shown to the right. Gray indicates no data available in the area.



ERIS

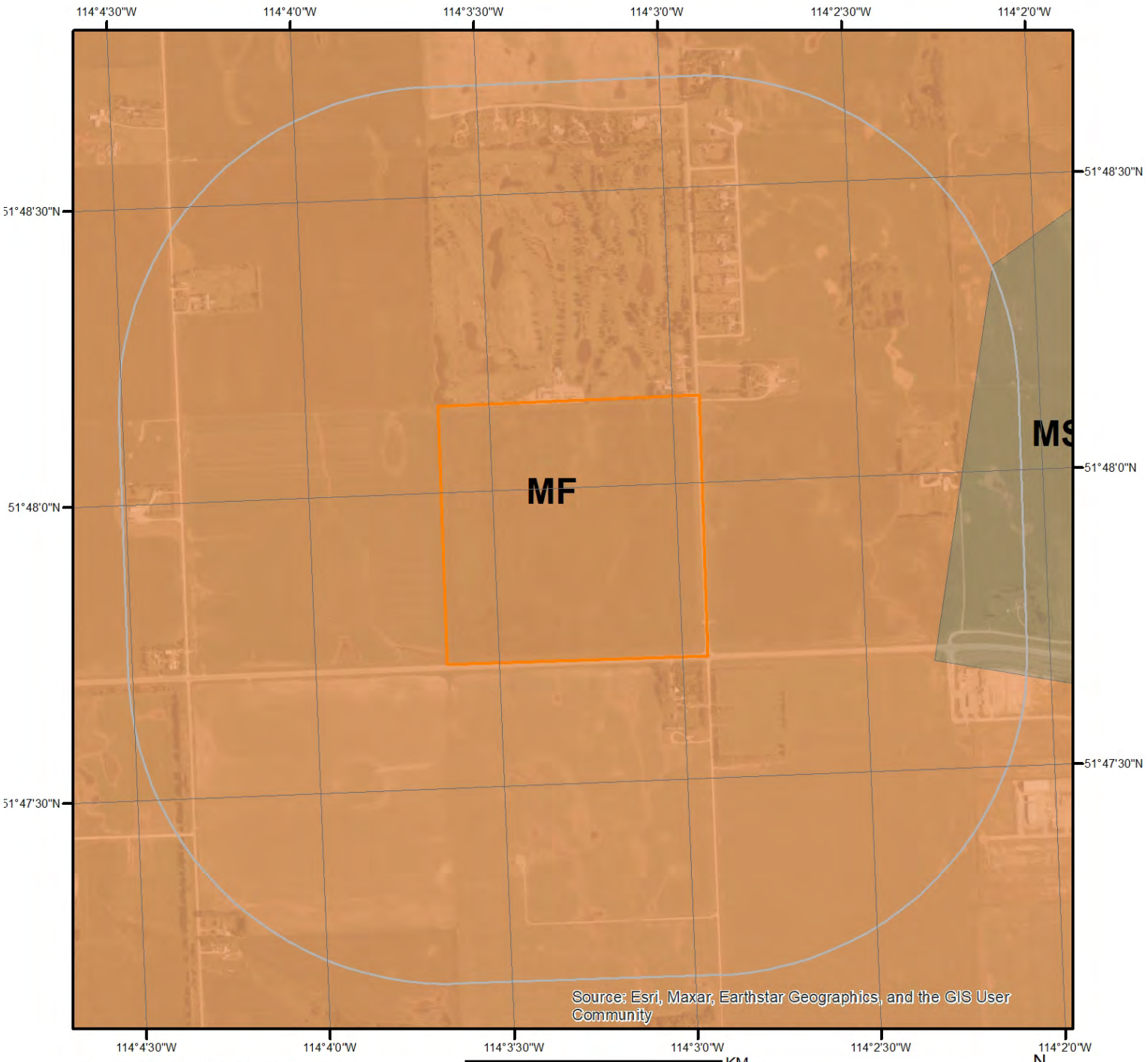
Geologic Information

Detailed bedrock geology information about each unit within the search radius is provided below.

Unit ID 1041

Unit Name:	Paskapoo Formation
Lithology:	Sandstone, siltstone, and mudstone
Environment:	Alluvial
Age:	Paleogene
Geological Regions:	Plains

Geologic Information



Surficial Geology

This map shows surficial geologic labels in the area. Please refer to the report for detailed descriptions. Data coverage is shown to the right. Gray indicates no data available in the area.

Geologic Information

Detailed surficial geology information about each unit within the search radius is provided below.

Unit ID MF

Unit Name:	Fluted moraine
Unit Description:	Glacially streamlined sediments, mainly till. Terrain varies from alternating furrows and ridges to nearly equidimensional smoothed hills; all landforms parallel the local ice flow direction; includes flutes, drumlins and drumlinoids.
Texture:	Sediment is mainly till may locally include stratified glaciolacustrine and/or glaciofluvial sediments.
Age:	Pleistocene

Unit ID MS

Unit Name:	Stagnant Ice Moraine
Unit Description:	Sediments resulting from the collapse and slumping of englacial and supraglacial debris in response to the melting of buried stagnant ice near the glacial margin. Characterized by low to high-relief hummocky topography.
Texture:	Sediment is mainly till but locally includes stratified glaciolacustrine or glaciofluvial sediments.
Age:	Pleistocene

Soil Information



Soil Map

0 0.2 0.4 0.8 1.2 KM

N

This map shows soil units around the target property. Please refer to the report for detailed soil descriptions.

Soil Information

Detailed soil information about each unit within the search radius is provided below.

Alberta Detailed Soil Survey (DSS3)

Polygon ID: ABD192012804

Component

Component ID:	ABD19201280401	**Slope Steepness(%):**	2
Soil Name ID:	ABATL~~~~~A	**Slope Length(m):**	225
Component No:	1		
Occupied by Component (%):	40		
Surface Stoniness Class:	Slightly stony		

Soil Name

Soil Name:	ANTLER
Kind of Surface Material:	Mineral
Soil Drainage Class:	Well drained
Water Table Charateristics:	Never
Parent Material 1, 2, 3:	Moderately Fine; Not Applicable; Not Applicable
Mode of Deposition 1, 2, 3:	Till (Morainal); Not Applicable; Not Applicable
Parent Material Chemical Property:	Moderately / Very Strongly Calcareous; Not Applicable; Not Applicable
Layer Restricting Root Growth:	No root restricting layer
Type of Root-Restricting Layer:	n/a

Soil Layer

Layer No:	1	**Very Fine Sand(%):**	9
Horizon:	Ap	**Total Sand(%):**	25
Depth(cm):	0-20	**Total Silt(%):**	45
pH in Calc Chloride:	5.7	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	4
Electrical conductivity (dS/m):	0		

Layer No:	2	**Very Fine Sand(%):**	9
Horizon:	Bm	**Total Sand(%):**	25
Depth(cm):	20-60	**Total Silt(%):**	45
pH in Calc Chloride:	6.3	**Total Clay(%):**	30

Soil Information

Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	1.3
Electrical conductivity (dS/m):	0		

Layer No:	3	**Very Fine Sand(%):**	11
Horizon:	Ck	**Total Sand(%):**	30
Depth(cm):	60-75	**Total Silt(%):**	50
pH in Calc Chloride:	7.7	**Total Clay(%):**	20
Saturated Hydraulic Conductivity(cm/h):	3	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Layer No:	4	**Very Fine Sand(%):**	8
Horizon:	Ck	**Total Sand(%):**	20
Depth(cm):	75-100	**Total Silt(%):**	50
pH in Calc Chloride:	7.6	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	1	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Component

Component ID:	ABD19201280402	**Slope Steepness(%):**	3
Soil Name ID:	ABDDY~~~~~A	**Slope Length(m):**	115
Component No:	2		
Occupied by Component (%):	40		
Surface Stoniness Class:	Slightly stony		

Soil Name

Soil Name:	DIDSBURY
Kind of Surface Material:	Mineral
Soil Drainage Class:	Well drained
Water Table Charateristics:	Never
Parent Material 1, 2, 3:	Moderately Fine; Not Applicable; Not Applicable
Mode of Deposition 1, 2, 3:	Till (Morainal); Not Applicable; Not Applicable
Parent Material Chemical Property:	Moderately / Very Strongly Calcareous; Not Applicable; Not Applicable
Layer Restricting Root Growth:	No root restricting layer
Type of Root-Restricting Layer:	n/a

Soil Layer

Soil Information

Layer No:	1	**Very Fine Sand(%):**	11
Horizon:	Ap	**Total Sand(%):**	39
Depth(cm):	0-18	**Total Silt(%):**	36
pH in Calc Chloride:	7.3	**Total Clay(%):**	25
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	4
Electrical conductivity (dS/m):	0		

Layer No:	2	**Very Fine Sand(%):**	11
Horizon:	Ah	**Total Sand(%):**	39
Depth(cm):	18-22	**Total Silt(%):**	36
pH in Calc Chloride:	7.3	**Total Clay(%):**	25
Saturated Hydraulic Conductivity(cm/h):	30	**Organic Carbon(%):**	7
Electrical conductivity (dS/m):	0		

Layer No:	3	**Very Fine Sand(%):**	11
Horizon:	Ah	**Total Sand(%):**	35
Depth(cm):	22-60	**Total Silt(%):**	40
pH in Calc Chloride:	8.2	**Total Clay(%):**	25
Saturated Hydraulic Conductivity(cm/h):	30	**Organic Carbon(%):**	5
Electrical conductivity (dS/m):	0		

Layer No:	4	**Very Fine Sand(%):**	12
Horizon:	Bm	**Total Sand(%):**	40
Depth(cm):	60-90	**Total Silt(%):**	40
pH in Calc Chloride:	8.2	**Total Clay(%):**	20
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	1
Electrical conductivity (dS/m):	0		

Layer No:	5	**Very Fine Sand(%):**	12
Horizon:	Ck	**Total Sand(%):**	40
Depth(cm):	90-100	**Total Silt(%):**	30
pH in Calc Chloride:	8.2	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	1	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Component

Component ID:	ABD19201280403	**Slope Steepness(%):**	2
Soil Name ID:	ABLPN~~~~~N	**Slope Length(m):**	50
Component No:	3		

Soil Information

Occupied by Component (%):	20
Surface Stoniness Class:	Slightly stony

Soil Name

Soil Name:	LONEPINE
Kind of Surface Material:	Mineral
Soil Drainage Class:	Well drained
Water Table Charateristics:	Never
Parent Material 1, 2, 3:	Medium; Moderately Fine; Not Applicable
Mode of Deposition 1, 2, 3:	Glaciolacustrine; Till (Morainal); Not Applicable
Parent Material Chemical Property:	Moderately / Very Strongly Calcareous; Undifferentiated; Not Applicable
Layer Restricting Root Growth:	No root restricting layer
Type of Root-Restricting Layer:	n/a

Soil Layer

Layer No:	1	**Very Fine Sand(%):**	3
Horizon:	Ah	**Total Sand(%):**	43
Depth(cm):	0-35	**Total Silt(%):**	39
pH in Calc Chloride:	6.5	**Total Clay(%):**	18
Saturated Hydraulic Conductivity(cm/h):	30	**Organic Carbon(%):**	5.2
Electrical conductivity (dS/m):	0		

Layer No:	2	**Very Fine Sand(%):**	4
Horizon:	Bm	**Total Sand(%):**	51
Depth(cm):	35-56	**Total Silt(%):**	29
pH in Calc Chloride:	6.5	**Total Clay(%):**	20
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	0.4
Electrical conductivity (dS/m):	0		

Layer No:	3	**Very Fine Sand(%):**	3
Horizon:	Bm	**Total Sand(%):**	42
Depth(cm):	56-81	**Total Silt(%):**	37
pH in Calc Chloride:	6.7	**Total Clay(%):**	21
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	0.6
Electrical conductivity (dS/m):	0		

Layer No:	4	**Very Fine Sand(%):**	2

Soil Information

Horizon:	Ck	**Total Sand(%):**	18
Depth(cm):	81-91	**Total Silt(%):**	56
pH in Calc Chloride:	7.3	**Total Clay(%):**	26
Saturated Hydraulic Conductivity(cm/h):	3	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Layer No:	5	**Very Fine Sand(%):**	10
Horizon:	Ck	**Total Sand(%):**	35
Depth(cm):	91-120	**Total Silt(%):**	30
pH in Calc Chloride:	7.4	**Total Clay(%):**	35
Saturated Hydraulic Conductivity(cm/h):	1	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Polygon ID: ABD192012864

Component

Component ID:	ABD19201286401	**Slope Steepness(%):**	3
Soil Name ID:	ABATL~~~~~A	**Slope Length(m):**	175
Component No:	1		
Occupied by Component (%):	50		
Surface Stoniness Class:	Slightly stony		

Soil Name

Soil Name:	ANTLER
Kind of Surface Material:	Mineral
Soil Drainage Class:	Well drained
Water Table Charateristics:	Never
Parent Material 1, 2, 3:	Moderately Fine; Not Applicable; Not Applicable
Mode of Deposition 1, 2, 3:	Till (Morainal); Not Applicable; Not Applicable
Parent Material Chemical Property:	Moderately / Very Strongly Calcareous; Not Applicable; Not Applicable
Layer Restricting Root Growth:	No root restricting layer
Type of Root-Restricting Layer:	n/a

Soil Layer

Layer No:	1	**Very Fine Sand(%):**	9

Soil Information

Horizon:	Ap	**Total Sand(%):**	25
Depth(cm):	0-20	**Total Silt(%):**	45
pH in Calc Chloride:	5.7	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	4
Electrical conductivity (dS/m):	0		

Layer No:	2	**Very Fine Sand(%):**	9
Horizon:	Bm	**Total Sand(%):**	25
Depth(cm):	20-60	**Total Silt(%):**	45
pH in Calc Chloride:	6.3	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	1.3
Electrical conductivity (dS/m):	0		

Layer No:	3	**Very Fine Sand(%):**	11
Horizon:	Ck	**Total Sand(%):**	30
Depth(cm):	60-75	**Total Silt(%):**	50
pH in Calc Chloride:	7.7	**Total Clay(%):**	20
Saturated Hydraulic Conductivity(cm/h):	3	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Layer No:	4	**Very Fine Sand(%):**	8
Horizon:	Ck	**Total Sand(%):**	20
Depth(cm):	75-100	**Total Silt(%):**	50
pH in Calc Chloride:	7.6	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	1	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Component

Component ID:	ABD19201286402	**Slope Steepness(%):**	3
Soil Name ID:	ABLPN~~~~~N	**Slope Length(m):**	165
Component No:	2		
Occupied by Component (%):	50		
Surface Stoniness Class:	Slightly stony		

Soil Name

Soil Name:	LONEPINE
Kind of Surface Material:	Mineral
Soil Drainage Class:	Well drained

Soil Information

Water Table Charateristics:	Never
Parent Material 1, 2, 3:	Medium; Moderately Fine; Not Applicable
Mode of Deposition 1, 2, 3:	Glaciolacustrine; Till (Morainal); Not Applicable
Parent Material Chemical Property:	Moderately / Very Strongly Calcareous; Undifferentiated; Not Applicable
Layer Restricting Root Growth:	No root restricting layer
Type of Root-Restricting Layer:	n/a

Soil Layer

Layer No:	1	**Very Fine Sand(%):**	3
Horizon:	Ah	**Total Sand(%):**	43
Depth(cm):	0-35	**Total Silt(%):**	39
pH in Calc Chloride:	6.5	**Total Clay(%):**	18
Saturated Hydraulic Conductivity(cm/h):	30	**Organic Carbon(%):**	5.2
Electrical conductivity (dS/m):	0		

Layer No:	2	**Very Fine Sand(%):**	4
Horizon:	Bm	**Total Sand(%):**	51
Depth(cm):	35-56	**Total Silt(%):**	29
pH in Calc Chloride:	6.5	**Total Clay(%):**	20
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	0.4
Electrical conductivity (dS/m):	0		

Layer No:	3	**Very Fine Sand(%):**	3
Horizon:	Bm	**Total Sand(%):**	42
Depth(cm):	56-81	**Total Silt(%):**	37
pH in Calc Chloride:	6.7	**Total Clay(%):**	21
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	0.6
Electrical conductivity (dS/m):	0		

Layer No:	4	**Very Fine Sand(%):**	2
Horizon:	Ck	**Total Sand(%):**	18
Depth(cm):	81-91	**Total Silt(%):**	56
pH in Calc Chloride:	7.3	**Total Clay(%):**	26
Saturated Hydraulic Conductivity(cm/h):	3	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Layer No:	5	**Very Fine Sand(%):**	10
Horizon:	Ck	**Total Sand(%):**	35
Depth(cm):	91-120	**Total Silt(%):**	30

Soil Information

pH in Calc Chloride:	7.4	**Total Clay(%):**	35
Saturated Hydraulic Conductivity(cm/h):	1	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Polygon ID: ABD192012956

Component

Component ID:	ABD19201295601	**Slope Steepness(%):**	3
Soil Name ID:	ABATL~~~~~A	**Slope Length(m):**	225
Component No:	1		
Occupied by Component (%):	60		
Surface Stoniness Class:	Slightly stony		

Soil Name

Soil Name:	ANTLER
Kind of Surface Material:	Mineral
Soil Drainage Class:	Well drained
Water Table Charateristics:	Never
Parent Material 1, 2, 3:	Moderately Fine; Not Applicable; Not Applicable
Mode of Deposition 1, 2, 3:	Till (Morainal); Not Applicable; Not Applicable
Parent Material Chemical Property:	Moderately / Very Strongly Calcareous; Not Applicable; Not Applicable
Layer Restricting Root Growth:	No root restricting layer
Type of Root-Restricting Layer:	n/a

Soil Layer

Layer No:	1	**Very Fine Sand(%):**	9
Horizon:	Ap	**Total Sand(%):**	25
Depth(cm):	0-20	**Total Silt(%):**	45
pH in Calc Chloride:	5.7	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	4
Electrical conductivity (dS/m):	0		

Layer No:	2	**Very Fine Sand(%):**	9
Horizon:	Bm	**Total Sand(%):**	25
Depth(cm):	20-60	**Total Silt(%):**	45

Soil Information

pH in Calc Chloride:	6.3	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	1.3
Electrical conductivity (dS/m):	0		

Layer No:	3	**Very Fine Sand(%):**	11
Horizon:	Ck	**Total Sand(%):**	30
Depth(cm):	60-75	**Total Silt(%):**	50
pH in Calc Chloride:	7.7	**Total Clay(%):**	20
Saturated Hydraulic Conductivity(cm/h):	3	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Layer No:	4	**Very Fine Sand(%):**	8
Horizon:	Ck	**Total Sand(%):**	20
Depth(cm):	75-100	**Total Silt(%):**	50
pH in Calc Chloride:	7.6	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	1	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Component

Component ID:	ABD19201295602	**Slope Steepness(%):**	3
Soil Name ID:	ABDDY~~~~~A	**Slope Length(m):**	115
Component No:	2		
Occupied by Component (%):	20		
Surface Stoniness Class:	Slightly stony		

Soil Name

Soil Name:	DIDSBURY
Kind of Surface Material:	Mineral
Soil Drainage Class:	Well drained
Water Table Charateristics:	Never
Parent Material 1, 2, 3:	Moderately Fine; Not Applicable; Not Applicable
Mode of Deposition 1, 2, 3:	Till (Morainal); Not Applicable; Not Applicable
Parent Material Chemical Property:	Moderately / Very Strongly Calcareous; Not Applicable; Not Applicable
Layer Restricting Root Growth:	No root restricting layer
Type of Root-Restricting Layer:	n/a

Soil Information

Soil Layer

Layer No:	1	**Very Fine Sand(%):**	11
Horizon:	Ap	**Total Sand(%):**	39
Depth(cm):	0-18	**Total Silt(%):**	36
pH in Calc Chloride:	7.3	**Total Clay(%):**	25
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	4
Electrical conductivity (dS/m):	0		

Layer No:	2	**Very Fine Sand(%):**	11
Horizon:	Ah	**Total Sand(%):**	39
Depth(cm):	18-22	**Total Silt(%):**	36
pH in Calc Chloride:	7.3	**Total Clay(%):**	25
Saturated Hydraulic Conductivity(cm/h):	30	**Organic Carbon(%):**	7
Electrical conductivity (dS/m):	0		

Layer No:	3	**Very Fine Sand(%):**	11
Horizon:	Ah	**Total Sand(%):**	35
Depth(cm):	22-60	**Total Silt(%):**	40
pH in Calc Chloride:	8.2	**Total Clay(%):**	25
Saturated Hydraulic Conductivity(cm/h):	30	**Organic Carbon(%):**	5
Electrical conductivity (dS/m):	0		

Layer No:	4	**Very Fine Sand(%):**	12
Horizon:	Bm	**Total Sand(%):**	40
Depth(cm):	60-90	**Total Silt(%):**	40
pH in Calc Chloride:	8.2	**Total Clay(%):**	20
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	1
Electrical conductivity (dS/m):	0		

Layer No:	5	**Very Fine Sand(%):**	12
Horizon:	Ck	**Total Sand(%):**	40
Depth(cm):	90-100	**Total Silt(%):**	30
pH in Calc Chloride:	8.2	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	1	**Organic Carbon(%):**	0
Electrical conductivity (dS/m):	0		

Component

Component ID:	ABD19201295603	**Slope Steepness(%):**	0.5
Soil Name ID:	ABZGW~~~~~N	**Slope Length(m):**	25

Soil Information

Component No:	3
Occupied by Component (%):	20
Surface Stoniness Class:	Slightly stony

Soil Name

Soil Name:	MISC.GLEYSOL
Kind of Surface Material:	Mineral
Soil Drainage Class:	Poorly drained
Water Table Charateristics:	Unspecified period
Parent Material 1, 2, 3:	Undifferentiated; Not Applicable; Not Applicable
Mode of Deposition 1, 2, 3:	Undifferentiated mineral; Not Applicable; Not Applicable
Parent Material Chemical Property:	Undifferentiated; Not Applicable; Not Applicable
Layer Restricting Root Growth:	No root restricting layer
Type of Root-Restricting Layer:	n/a

Soil Layer

Layer No:	1	**Very Fine Sand(%):**	12
Horizon:	Ah	**Total Sand(%):**	40
Depth(cm):	0-20	**Total Silt(%):**	40
pH in Calc Chloride:	6.5	**Total Clay(%):**	20
Saturated Hydraulic Conductivity(cm/h):	30	**Organic Carbon(%):**	5
Electrical conductivity (dS/m):	0		

Layer No:	2	**Very Fine Sand(%):**	11
Horizon:	Bg	**Total Sand(%):**	40
Depth(cm):	20-50	**Total Silt(%):**	30
pH in Calc Chloride:	6.5	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	10	**Organic Carbon(%):**	2
Electrical conductivity (dS/m):	0		

Layer No:	3	**Very Fine Sand(%):**	11
Horizon:	Ckg	**Total Sand(%):**	40
Depth(cm):	50-100	**Total Silt(%):**	30
pH in Calc Chloride:	7	**Total Clay(%):**	30
Saturated Hydraulic Conductivity(cm/h):	1	**Organic Carbon(%):**	1
Electrical conductivity (dS/m):	0		

Wells and Additional Sources



Wells & Additional Sources

- Project Property
- Buffer
- Buffer
- Buffer
- Buffer
- Buffer
- Buffer
- Buffer
- Buffer
- Buffer
- Buffer
- Buffer
- Buffer
- Buffer
- Buffer
- Sites with Higher Elevation
- Sites with Same Elevation
- Sites with Lower Elevation
- Sites with Unknown Elevation
- World Imagery

0 0.225 0.45 0.9 KM

N

ERIS

Wells and Additional Sources



Wells & Additional Sources - Page 1

- Sites with Higher Elevation
- Sites with Same Elevation
- Sites with Lower Elevation
- Sites with Unknown Elevation

Wells and Additional Sources Summary

Federal Sources

National Energy Board Wells

Map Key	ID	Distance (m)	Direction
	No records found		

Provincial Sources

AER Incidents & Spills

Map Key	ID	Distance (m)	Direction
	No records found		

Alberta Oil and Gas Wells

Map Key	ID	Distance (m)	Direction
	No records found		

Alberta Orphan Wells

Map Key	ID	Distance (m)	Direction
	No records found		

Alberta Water Well Information Database

Map Key	Well ID	Distance (m)	Direction
3	416138	0.	-
3	416139	0.	-
4	409796	219.4	SSE

Approved Oilfield Waste Management Facilities

Map Key	ID	Distance (m)	Direction
	No records found		

Groundwater Well Network

Map Key	ID	Distance (m)	Direction
	No records found		

Horizontal Wells

Map Key	ID	Distance (m)	Direction
	No records found		

Wells and Additional Sources Summary

Oil and Gas Facilities - ST102 & ST50

Map Key	ID	Distance (m)	Direction
	No records found		

Well Licenses

Map Key	Unique Well ID	Distance (m)	Direction
2	00/07-03-033-01W5/0	0.	-
2		0.	-

Private Sources

Oil and Gas Wells

Map Key	ID	Distance (m)	Direction
	No records found		

Alberta Water Well Information Database

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
3	-	0.00	0.00	1,021.00	WWIS

Well ID:	416138	Elevation Source:	Estimated
Driller ID:	24254	Method of Drilling:	
Licence No:		GPS Obtained:	Not Verified
GIC Well ID:	416138	Boundary From:	
GOA Well Tag No:		Distance North:	
Elevation (ft):	3340.00000000	Distance South:	
Depth (ft):		Distance East:	
Date Completed:		Distance West:	
Proposed Use:		Additional Desc:	
Lot:		Validated?:	TRUE
Block:		Submitted?:	TRUE
Plan:		Location Locked?:	TRUE
Type of Work:		Longitude:	-114.05786400
Flowing Well:		Latitude:	51.80054300
Date Started:		LSD:	7
Water Req Per Day:		Section:	3
Gas Present:		Township:	33
Oil Present:		Range:	1
Flow Rate:		Meridian:	5
Drilling Company:		DLS Coordinates:	7-3-33-1-5
Owner Mailing Address:			
Driller Mailing Address:			

Well Report ID:	416138	Annular Seal Mat:	Formation Packer
Well Owner ID:	10685845	Annular Seal from:	0.00
Driller ID:	2533726	Annular Seal to:	120.00
Drill Company ID:	24254	Annular Seal Amt:	
Drill Instance ID:	8335154	Annular Seal Units:	
Drill Comp Well ID:		Drilling Method:	Rotary
Existing Well ID:		Drilling Start Dt:	1978/11/13
Date Received:	1978/12/11	Drilling End Dt:	1978/11/13
Type of Work:	New Well	Pack Type:	
Plug Date:		Pack Grain Size:	
Plug Material Type:		Pack Amount:	
Plug Mat Amount:		Pack Units:	
Plugged Units:		Loc Verify Method:	Not Verified
Well Use:	Industrial	Dist Casing Ground:	
Other Well Use:		Artesian Flow?:	FALSE
Total Depth Drill:	142.00	Artesian Flow Rate:	
Finish Well Depth:		Gas Depth:	

Wells and Additional Sources Detail Report

Casing Material:	Steel	Encounter Gas?:	FALSE
Casing OD:	4.50	Flow Ctrl Install?:	FALSE
Casing Thickness:	0.00	Recommended Rate:	0.00
Casing Bottom:	142.00	Recom Intake Depth:	0.00
Liner Material:		Pump Installed?:	TRUE
Liner OD:	0.00	Pump Install Depth:	
Liner Thickness:	0.00	Pump Model:	
Liner Top:	0.00	Pump Horsepower:	3
Liner Bottom:	0.00	Well Disinfected?:	FALSE
Perforation by:		Other Log:	
Screen Material:		Divert Water Src:	
Screen Size OD:	0.00	Divert Water Amt:	
Screen Attachment:		Diversion Dt/Time:	
Screen Top Fitting:		Is Submitted?:	TRUE
Screen Bot Fitting:		Is Validated?:	TRUE
Encounter Saline Water?:	FALSE		
Saline Water Depth:			
Potability Sample Taken?:	FALSE		
Potable Sample Sent to AENV?:	FALSE		
Approval Holder Sign Date:			
Drilling Report Given to Owner:	FALSE		
Model Output Rating:			
Remedial Action:			
Flow Control Description:			
Pump Type Installed:	SUB		
Created by:			
Submitted by:			
Additional Comments:	DRILLER STATES WATER IS SOFT.		

Well Owner ID:	10685845
Owner Name:	CANADIAN SUPERIOR
PO Box:	
Address:	
City:	
Postal Code:	
Province:	
Country:	

Driller ID:	2533726
Last Name:	DRILLER
Middle Initial:	NA
First Name:	UNKNOWN
Journeyman No:	1
Is Active?:	TRUE

Wells and Additional Sources Detail Report

Starting Well ID:	2059200
Ending Well ID:	2059299
Last Well ID Used:	2059205
Company Name:	ALL RITE DRILLING LTD.
Street Address:	7819 - 50 AVENUE
City:	RED DEER
Province:	AB
Country:	AB
Postal Code:	
E-Mail:	gwinfo@gov.ab.ca
Is Active?:	TRUE

Geophysical Log ID:	5921481
Log Type:	Gamma
Log Taken?:	FALSE
Sent to AENV?:	FALSE

Geophysical Log ID:	5518406
Log Type:	Electric
Log Taken?:	FALSE
Sent to AENV?:	FALSE

Borehole ID:	621294
Diameter:	0.000000
From:	0.000000
To:	142.000000

Depth:	80.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Clay

Depth:	135.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Coal

Depth:	130.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Shale

Depth:	142.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Shale

Pump Test ID:	10348602
Test Date:	1978/11/13
Start Time:	1900/01/12
Taken from Top of Casing:	FALSE
Static Water Level:	90.00
End Water Level:	
Water Removal Type:	Pump
Water Removal Rate:	20.00
Removal Depth from:	0.00
Reason for Short Test:	

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
3	-	0.00	0.00	1,021.00	WWIS

Well ID:	416139	Elevation Source:	Estimated
Driller ID:	24254	Method of Drilling:	
Licence No:		GPS Obtained:	Not Verified
GIC Well ID:	416139	Boundary From:	
GOA Well Tag No:		Distance North:	
Elevation (ft):	3335.00000000	Distance South:	
Depth (ft):		Distance East:	
Date Completed:		Distance West:	
Proposed Use:		Additional Desc:	
Lot:		Validated?:	TRUE
Block:		Submitted?:	TRUE
Plan:		Location Locked?:	TRUE
Type of Work:		Longitude:	-114.05786400
Flowing Well:		Latitude:	51.80054300
Date Started:		LSD:	7
Water Req Per Day:		Section:	3
Gas Present:		Township:	33
Oil Present:		Range:	1

Wells and Additional Sources Detail Report

Flow Rate:		Meridian:	5
Drilling Company:		DLS Coordinates:	7-3-33-1-5
Owner Mailing Address:			
Driller Mailing Address:			

Well Report ID:	416139	Annular Seal Mat:	Formation Packer
Well Owner ID:	10685846	Annular Seal from:	0.00
Driller ID:	2533726	Annular Seal to:	120.00
Drill Company ID:	24254	Annular Seal Amt:	
Drill Instance ID:	8335154	Annular Seal Units:	
Drill Comp Well ID:		Drilling Method:	Rotary
Existing Well ID:		Drilling Start Dt:	1978/11/14
Date Received:	1978/12/11	Drilling End Dt:	1978/11/14
Type of Work:	New Well-Decommissioned	Pack Type:	
Plug Date:	1978/12/14	Pack Grain Size:	
Plug Material Type:	Cement	Pack Amount:	
Plug Mat Amount:		Pack Units:	
Plugged Units:		Loc Verify Method:	Not Verified
Well Use:	Industrial	Dist Casing Ground:	
Other Well Use:		Artesian Flow?:	FALSE
Total Depth Drill:	142.00	Artesian Flow Rate:	
Finish Well Depth:		Gas Depth:	
Casing Material:		Encounter Gas?:	FALSE
Casing OD:	0.00	Flow Ctrl Install?:	FALSE
Casing Thickness:	0.00	Recommended Rate:	0.00
Casing Bottom:	0.00	Recom Intake Depth:	0.00
Liner Material:	Steel	Pump Installed?:	TRUE
Liner OD:	4.50	Pump Install Depth:	
Liner Thickness:	0.00	Pump Model:	
Liner Top:	0.00	Pump Horsepower:	3
Liner Bottom:	142.00	Well Disinfected?:	FALSE
Perforation by:	Torch	Other Log:	
Screen Material:		Divert Water Src:	
Screen Size OD:	0.00	Divert Water Amt:	
Screen Attachment:		Diversion Dt/Time:	
Screen Top Fitting:		Is Submitted?:	TRUE
Screen Bot Fitting:		Is Validated?:	TRUE
Encounter Saline Water?:	FALSE		
Saline Water Depth:			
Potability Sample Taken?:	FALSE		
Potable Sample Sent to AENV?:	FALSE		
Approval Holder Sign Date:			
Drilling Report Given to Owner:	FALSE		
Model Output Rating:			
Remedial Action:			

Flow Control Description:
Pump Type Installed: SUB
Created by:
Submitted by:
Additional Comments: DRILLER STATES WATER IS SOFT.

Well Owner ID: 10685846
Owner Name: CANADIAN SUPERIOR
PO Box:
Address:
City:
Postal Code:
Province:
Country:

Driller ID: 2533726
Last Name: DRILLER
Middle Initial: NA
First Name: UNKNOWN
Journeyman No: 1
Is Active?: TRUE

Starting Well ID: 2059200
Ending Well ID: 2059299
Last Well ID Used: 2059205
Company Name: ALL RITE DRILLING LTD.
Street Address: 7819 - 50 AVENUE
City: RED DEER
Province: AB
Country: AB
Postal Code:
E-Mail: gwinfo@gov.ab.ca
Is Active?: TRUE

Perforation ID: 4190363
From: 120.000000
To: 140.000000
Diameter: 0.000000
Interval: 0.000000

Geophysical Log ID: 5921482
Log Type: Gamma

Log Taken?:	FALSE
Sent to AENV?:	FALSE

Geophysical Log ID:	5518407
Log Type:	Electric
Log Taken?:	FALSE
Sent to AENV?:	FALSE

Borehole ID:	621295
Diameter:	0.000000
From:	0.000000
To:	142.000000

Depth:	65.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Clay

Depth:	80.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Siltstone

Depth:	138.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Sandstone

Depth:	132.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Shale

Depth:	118.000000
Water Bearing:	FALSE
Colour:	

Description:	
Material:	Siltstone
Depth:	142.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Siltstone
Depth:	110.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Shale
Pump Test ID:	10348603
Test Date:	1978/11/14
Start Time:	1900/01/12
Taken from Top of Casing:	FALSE
Static Water Level:	80.00
End Water Level:	
Water Removal Type:	Pump
Water Removal Rate:	20.00
Removal Depth from:	0.00
Reason for Short Test:	

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
4	SSE	0.22	219.40	1,018.00	WWIS

Well ID:	409796	Elevation Source:	Estimated
Driller ID:	24288	Method of Drilling:	
Licence No:		GPS Obtained:	Map
GIC Well ID:	409796	Boundary From:	
GOA Well Tag No:		Distance North:	
Elevation (ft):	3350.00000000	Distance South:	
Depth (ft):		Distance East:	
Date Completed:		Distance West:	
Proposed Use:		Additional Desc:	
Lot:		Validated?:	TRUE
Block:		Submitted?:	TRUE
Plan:		Location Locked?:	TRUE
Type of Work:		Longitude:	-114.05203000
Flowing Well:		Latitude:	51.79313300

Wells and Additional Sources Detail Report

Date Started:		LSD:	16
Water Req Per Day:		Section:	34
Gas Present:		Township:	32
Oil Present:		Range:	1
Flow Rate:		Meridian:	5
Drilling Company:		DLS Coordinates:	16-34-32-1-5
Owner Mailing Address:			
Driller Mailing Address:			

Chem Analysis ID:	2086207
Well Report ID:	409796
Sample No:	1809
Sample Date:	
Analysis Date:	1979/02/26
Laboratory:	AE
Water Level:	90.000000
Aquifer:	
Remarks:	

Element Name:	Sulphate
Element Symbol:	SO4
Decimal Places:	4
Value:	1174.707820

Element Name:	Total Hardness
Element Symbol:	TH
Decimal Places:	4
Value:	419.000000

Element Name:	total Kjeldahl nitrogen
Element Symbol:	TKN
Decimal Places:	4
Value:	0.000000

Element Name:	Calcium
Element Symbol:	CA
Decimal Places:	4
Value:	100.999596

Element Name:	Potassium
Element Symbol:	K

Decimal Places: 4
Value: 5.116000

Element Name: Hydroxide
Element Symbol: OH
Decimal Places: 4
Value: 0.000000

Element Name: Electrical Conductivity
Element Symbol: EC
Decimal Places: 0
Value: 2980.000000

Element Name: Magnesium
Element Symbol: MG
Decimal Places: 4
Value: 40.033152

Element Name: Sodium
Element Symbol: NA
Decimal Places: 4
Value: 545.001100

Element Name: Nitrite
Element Symbol: NO2
Decimal Places: 4
Value: -0.050400

Element Name: Total Alkalinity
Element Symbol: TA
Decimal Places: 4
Value: 398.000000

Element Name: Nitrate plus Nitrite
Element Symbol: NO2_NO3_N
Decimal Places: 4
Value: 0.459200

Element Name: Total Phosphorus

Element Symbol: TP
Decimal Places: 4
Value: 0.000000

Element Name: Ion Balance
Element Symbol: IONBAL
Decimal Places: 4
Value: 0.990000

Element Name: Silica
Element Symbol: SIO2
Decimal Places: 4
Value: 6.400000

Element Name: Chloride
Element Symbol: CL
Decimal Places: 4
Value: 4.004400

Element Name: Iron
Element Symbol: FE
Decimal Places: 4
Value: 0.160000

Element Name: Total Dissolved Solids
Element Symbol: TDS
Decimal Places: 0
Value: 2109.000000

Element Name: Fluoride
Element Symbol: F
Decimal Places: 4
Value: 0.420000

Element Name: pH
Element Symbol: PH
Decimal Places: 2
Value: 8.100000

Wells and Additional Sources Detail Report

Element Name:	Bicarbonate
Element Symbol:	HCO3
Decimal Places:	4
Value:	485.046853

Well Report ID:	409796	Annular Seal Mat:	Driven
Well Owner ID:	10688327	Annular Seal from:	0.00
Driller ID:	2533726	Annular Seal to:	39.00
Drill Company ID:	24288	Annular Seal Amt:	
Drill Instance ID:	8335238	Annular Seal Units:	
Drill Comp Well ID:		Drilling Method:	Combination
Existing Well ID:		Drilling Start Dt:	
Date Received:	1979/06/12	Drilling End Dt:	1978/12/12
Type of Work:	New Well	Pack Type:	
Plug Date:		Pack Grain Size:	
Plug Material Type:		Pack Amount:	
Plug Mat Amount:		Pack Units:	
Plugged Units:		Loc Verify Method:	Map
Well Use:	Domestic & Stock	Dist Casing Ground:	
Other Well Use:		Artesian Flow?:	FALSE
Total Depth Drill:	135.00	Artesian Flow Rate:	
Finish Well Depth:		Gas Depth:	
Casing Material:	Steel	Encounter Gas?:	FALSE
Casing OD:	5.56	Flow Ctrl Install?:	FALSE
Casing Thickness:	0.19	Recommended Rate:	0.00
Casing Bottom:	39.00	Recom Intake Depth:	125.00
Liner Material:	Steel	Pump Installed?:	FALSE
Liner OD:	4.56	Pump Install Depth:	
Liner Thickness:	0.14	Pump Model:	
Liner Top:	0.00	Pump Horsepower:	
Liner Bottom:	135.00	Well Disinfected?:	FALSE
Perforation by:	Torch	Other Log:	
Screen Material:		Divert Water Src:	
Screen Size OD:	0.00	Divert Water Amt:	
Screen Attachment:		Diversion Dt/Time:	
Screen Top Fitting:		Is Submitted?:	TRUE
Screen Bot Fitting:		Is Validated?:	TRUE
Encounter Saline Water?:	FALSE		
Saline Water Depth:			
Potability Sample Taken?:	FALSE		
Potable Sample Sent to AENV?:	FALSE		
Approval Holder Sign Date:			
Drilling Report Given to Owner:	FALSE		
Model Output Rating:			
Remedial Action:			

Wells and Additional Sources Detail Report

Flow Control Description:
Pump Type Installed:
Created by:
Submitted by:
Additional Comments:

Well Owner ID:	10688327
Owner Name:	ALEXANDER, R.M./ JOYCE K.
PO Box:	699
Address:	OLDS
City:	
Postal Code:	T0M 1P0
Province:	
Country:	

Driller ID:	2533726
Last Name:	DRILLER
Middle Initial:	NA
First Name:	UNKNOWN
Journeyman No:	1
Is Active?:	TRUE

Starting Well ID:	1245000
Ending Well ID:	1249999
Last Well ID Used:	1245342
Company Name:	DOERING DRILLING LTD.
Street Address:	BOX 4028
City:	OLDS
Province:	AB
Country:	CA
Postal Code:	T4H 1P6
E-Mail:	GWINFO@GOV.AB.CA
Is Active?:	FALSE

Perforation ID:	4192466
From:	95.000000
To:	135.000000
Diameter:	0.125000
Interval:	6.000000

Geophysical Log ID:	5927450
Log Type:	Gamma

Log Taken?:	FALSE
Sent to AENV?:	FALSE

Geophysical Log ID:	5524375
Log Type:	Electric
Log Taken?:	FALSE
Sent to AENV?:	FALSE

Borehole ID:	626354
Diameter:	0.000000
From:	0.000000
To:	135.000000

Depth:	76.000000
Water Bearing:	FALSE
Colour:	Gray
Description:	
Material:	Till & Rocks

Depth:	116.000000
Water Bearing:	FALSE
Colour:	
Description:	Fine Grained
Material:	Sandstone

Depth:	96.000000
Water Bearing:	FALSE
Colour:	
Description:	Fine Grained
Material:	Sandstone

Depth:	109.000000
Water Bearing:	FALSE
Colour:	Black
Description:	Carbonaceous
Material:	Shale

Depth:	20.000000
Water Bearing:	FALSE
Colour:	Brown

Description:	
Material:	Till

Depth:	104.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Coal

Depth:	135.000000
Water Bearing:	FALSE
Colour:	
Description:	
Material:	Shale & Sandstone

Depth:	31.000000
Water Bearing:	FALSE
Colour:	Gray
Description:	Sandy
Material:	Till

Depth:	89.000000
Water Bearing:	FALSE
Colour:	Gray
Description:	
Material:	Shale

Depth:	102.000000
Water Bearing:	FALSE
Colour:	Gray
Description:	
Material:	Shale

Pump Test ID:	10350290
Test Date:	1978/12/12
Start Time:	1900/01/12
Taken from Top of Casing:	FALSE
Static Water Level:	0.00
End Water Level:	
Water Removal Type:	Bailer
Water Removal Rate:	15.00

Removal Depth from: 0.00
Reason for Short Test:

General Well File

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
1	-	0.00	0.00	1,020.00	OGW

UWI:	100070303301W500	Survey System:	DLS
Licence No:	0072245	Surf Location:	07-03-033-01-W5
Last Production:		Surf Township:	033
Well Type:	Not Applicable	Surf Meridian:	W5
Well Profile:	Vertical	Surf Range:	01
Current Status:	Abandoned	Surf Section:	03
Status Date:	1979-01-05	Surf LSD:	07
Status Source:	AER	Surf Longitude:	-114.055749
Spud Date:	1978-11-25	Surf Latitude:	51.799975
Final Drill Date:	1978-12-29	Surf Twp Range:	033-01-W5
Rig Release Date:	NULL	Surf Quarter Unit:	Not Applicable
Ground Elevation:	1018.8	Surf Unit:	Not Applicable
KB Elevation:	1025.8	Surf Block:	Not Applicable
Total Depth:	2780	Surf NTS Map Sheet:	Not Applicable
Lahee Class:	New Pool Wildcat	Surf Series:	Not Applicable
TVD:	2780	Surf Area:	Not Applicable
Confidntl Rel Date:	NULL	Surf Sheet:	Not Applicable
Abandon Date:	1979-01-05	Surf Quarter Sec:	SE
Surf Abandon Date:	1979-01-05	BH Location:	07-03-033-01-W5
Formation:	Unspecified	BH Township Range:	033-01-W5
Field:	Garrington	BH Quarter Unit:	Not Applicable
Pool:	Unspecified	BH Unit:	Not Applicable
OS Area:	Not Applicable	BH Block:	Not Applicable
OS Deposit:	Not Applicable	BH NTS Map Sheet:	Not Applicable
Licence Date:	1978-10-03	BH Series:	Not Applicable
Confidential:	Non-Confidential	BH Area:	Not Applicable
Surface Owner:	Unspecified	BH Sheet:	Not Applicable
Drilling Contractor:	Unspecified	BH Quarter Section:	SE
Days Drilling:	34	BH Longitude:	-114.055749
Drill m\day:	81.76	BH Latitude:	51.799975
Province:	Alberta	BH Township:	033
Projected Depth:	NULL	BH Meridian:	W5
Completion Date:	NULL	BH Range:	01
Agent:	Unspecified	BH Section:	03
Unit ID:	NULL	BH LSD:	07
Unit Flag:	No	Municipality:	NULL
Regulatory Agency:	AER	PSAC Area Code:	AB3
Unit Name:	NULL	PSAC Area Name:	Southeastern Alberta
Well Name:	MARATHON CDN-SUP OLDS 7-3-33-1		
Current Operator:	No Current Operator		

Wells and Additional Sources Detail Report

Curr Op Parent Name:	Unspecified
Licensee:	Repsol Oil & Gas Canada Inc.
Lic Parent Co Name:	Repsol

Well Stat Date:	19781003	Type Status:	Not Applicable
Fluid Status:	Not Applicable	Structure Status:	Not Applicable
Mode Status:	Not Applicable		
Well Stat Code:	00000000		

Well Stat Date:	19790105	Type Status:	Not Applicable
Fluid Status:	Not Applicable	Structure Status:	Not Applicable
Mode Status:	ABANDONED		
Well Stat Code:	00020000		

Obs No:	01	Casing Steel Process:	
Casing Date:	00000000	Cas Yield Strength:	000
Casing Desc:	SURFACE	Shoe Set Depth:	00556.00
Casing Size:	0244.5	Liner Top Depth:	00000.00
Casing Density:	0000.0		

DST Test No:	01	DST Company:	HISTORICAL
DST Test:	Drill Stem Test	DST Stat Press:	001137
DST Test Sub:	Reverse-Circulation DST	Fin Flow Press:	000761
DST Date:	19790101	Valve Open Time:	0090
DST Fluid:	Mud	Gas Surface Time:	0000
DST Fluid Recovrd:	00000.70	Max Gas Flow:	00000.0
DST Fluid Units:	M3	Fin Gas Flow:	00000.0
Record Depth:	1914.00	Oil Surface Time:	0000
DST Misrun Flag:	1	Max Oil Flow:	00000.0
DST Misrun Desc:	Mechanically Good	Wtr Surface Time:	0000
Intrvl Top:	01925.00	Max Wtr Flow:	00000.0
DST Intrvl Base:	01980.00	Pipe Int Diam:	00097.2
Cushion Type Desc:	None	Cushion Length:	00000.0

Well Licenses

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
2	-	0.00	0.00	1,020.00	AERW

Unique Well ID:	00/07-03-033-01W5/0	Agent:	
Well Status:	0002000000	Operator:	
Keylist:	0335010307000	Field:	0405
License No:	0072245	Pool:	0000000
Licence Status:	RecCertified	OS Area:	
Licence Date:	1978-10-03	OS Dep:	0000000

Stat Date:	1979-01-05	Max True Vert Depth:	0.0
Well Fluid:	N/A	Ground Elevation:	1018.8
Well Mode:	ABD	Surf Loc:	
Well Type:	N/A	EDCT:	
Well Structure:	N/A	Rating Ev:	
Scheme Type:		Op Surv Prov:	
Scheme Subt:		FD Date:	1978-12-29
Bttm/Surface Hole:	Bottom Holes	Total Dep:	2780.0
Fluid Short Desc:	Not Applicable	KBE:	
Mode Short Desc:	ABANDONED	Latitude:	51.8
Type Short Desc:	Not Applicable	Longitude:	-114.056
Update:			
Structure Short Description:	Not Applicable		
Licensee:	Repsol Oil & Gas Canada Inc.		

KBE: 1025.8

Map Key	Direction	Distance (km)	Distance (m)	Elevation (m)	DB
2	-	0.00	0.00	1,020.00	AERW

Unique Well ID:		Agent:	
Well Status:		Operator:	
Keylist:		Field:	
License No:	0072245	Pool:	
Licence Status:	RecCertified	OS Area:	
Licence Date:	31 Dec 1998	OS Dep:	
Stat Date:		Max True Vert Depth:	
Well Fluid:		Ground Elevation:	1018.8
Well Mode:		Surf Loc:	07-03-033-01W5
Well Type:		EDCT:	BWL
Well Structure:		Rating Ev:	J
Scheme Type:		Op Surv Prov:	
Scheme Subt:		FD Date:	
Bttm/Surface Hole:	Surface Holes	Total Dep:	
Fluid Short Desc:		KBE:	
Mode Short Desc:		Latitude:	51.8
Type Short Desc:		Longitude:	-114.056
Update:			
Structure Short Description:			
Licensee:			

KBE: 1025.8

Radon Information

Detailed radon information for the project property is provided below.

Radon Zone Information

ID:	144850	**Radon Rank:**	HIGH

Health Canada Radon Information

Health Region:	4824
Health Region Name:	David Thompson Regional Health Authority
Province or Territory:	AB
Number Homes in Survey:	107
% Below 200 Bq/m3:	92.5
% Above 200 Bq/m3:	7.5
200 to 600 Bq/m3:	7.5
% Above 600 Bq/m3:	0

Appendix

Federal Sources

Bedrock Geology of Canada — **BEDROCK GEOLOGY**

The Geological Map of Canada is scaled at 1:5,000,000. This map is created by Geological Survey of Canada and published by Natural Resources Canada.

Health Canada Radon Information — **RADON**

This source is the results from the Cross-Canada Survey of Radon Concentrations in Homes, a two-year study conducted by Health Canada's National Radon Program. The aims of this study were to obtain an estimate of the proportion of the Canadian population living in homes with radon gas levels above the guideline of 200 Bq/m3, to identify previously unknown areas where radon gas exposure may constitute a health risk, and to build, over time, a map of indoor radon gas exposure levels across Canada.

National Energy Board Wells — **NEBP**

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

Soil Landscapes of Canada (SLC) — **SLC**

Major characteristics of soil and land such as surface form, slope, water table depth, permafrost and lakes.

Surficial Geology of Canada — **SURFICIAL GEOLOGY**

This map contains information on surficial materials and associated landforms left by the retreat of the last glaciers and non glacial environments. It is based on compilation of existing maps. This data was authored by the Geological Survey of Canada and published by Natural Resources Canada.

Toporama — **TOPORAMA**

Toporama covers the entire area of Canada's landmass and provides topographic, geo-referenced, and symbolic information in a raster format at 1:50,000 scale. This is a digital topographic reference product made available by Natural Resources Canada (NRCan).

Provincial Sources

AER Incidents & Spills — **FIS**

Received from the Alberta Energy Regulator (AER) - formerly the ERCB (Energy Resources Conservation Board) and EUB (Energy Utilities Board) - this database, which used to be called EISL (Environmental Information System Listing), contains reported environmental incidents beginning in 1975. Descriptions include noise infractions, air quality emissions, oil spills and failures for pipelines, wells, plants, and batteries. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location. Therefore, locations will be accurate to the quarter section only.

Alberta Detailed Soil Survey (DSS3) — **SOIL SURVEY**

Soil surveys have been published for most of the agricultural areas, and many surrounding areas, across Canada. Data from these surveys comprise the most detailed soil inventory information in the National Soil DataBase. Data is made available by Agriculture and Agri-Food Canada

Alberta Oil and Gas Wells — **AOGW**

The Alberta Energy Utilities Board - now the Alberta Energy Regulator (AER) - maintained a database of oil and gas wells drilled in the province of Alberta. The database contains information on well name, licensee name, license number, location, status, total well depth and date of final drilling. Please note that this database will not be updated, information on wells drilled after September 2003 can be found in the Oil and Gas Wells (OGW) database under the 'Private Source Database' section.

Alberta Orphan Wells — **ORP**

The Orphan Well Association (OWA) maintains lists of properties designated as orphan by the Alberta Energy Regulator (AER). Includes the location, well ID, licensee name and license number of orphan wells, sites, and facilities that have been identified for the purpose of abandonment, suspension, decommission,

and reclamation. Legacy wells under long term care and custody are excluded. Please note that the OWA Orphan List also includes properties with production information from the AER. The OWA makes no representation, warranties, or guarantees, expressed or implied, for the fitness of the data with respect to its use.

Alberta Water Well Information Database **WWIS**

List of wells in the Alberta Water Well Information Database made available by Alberta Environment and Parks, containing approximately 500,000 records with nearly 5,000 drilling reports added annually. Some geographic coordinates have been provided in ATS (Alberta Township Survey system) format but do not contain offsets that are necessary to pinpoint a specific location; some locations will be accurate to the quarter section only. The Province of Alberta advises that the data may not be fully checked, and disclaims all responsibility for its accuracy. This data was previously collected from the Groundwater Information Center of the Natural Resource Service.

Approved Oilfield Waste Management Facilities **DRWD**

A list of approved first and third party oilfield waste management facilities. First-party receivers can only accept upstream oilfield waste generated by one oil and gas company, but can come from various sites. Third-party receivers can accept upstream oilfield waste from various sites and various generators. This data is made available by the Alberta Energy Regulator (AER).

Bedrock Geology of Alberta **BEDROCK GEOLOGY**

This dataset represents the compilation of existing geological maps and original geological mapping by Alberta Geological Survey (AGS) staff. Mapping in support of the dataset included field observations and creating three-dimensional models of subsurface stratigraphy based on the interpretation of geophysical logs from oil and gas wells. Each three-dimensional formation surface was projected to a model of the bedrock surface, and the intersection formed the first approximation of the position of the geological contact at the base of the surficial deposits. This data is made available by Alberta Geological Survey.

General Well File **OGW**

Wells from the General Well File made available by the Alberta Energy Regulator (AER).

Groundwater Well Network **GROUNDWATER**

Groundwater level, chemical analysis and water quality data from monitoring wells that are part of the Groundwater Observation Well Network (GOWN).

Horizontal Wells **HORW**

A horizontal well is created by drilling the lower part of the wellbore parallel to the zone of interest. These wells must be drilled directionally at an angle exceeding 80 degrees. Horizontal drilling can help increase resource recovery while minimizing surface impacts. While horizontal drilling has been used for decades, technological improvements have made it possible to combine horizontal drilling with hydraulic fracturing to help coax oil and natural gas out of tight rock. Today, more than half of western Canada's wells are being drilled horizontally. Horizontal well list includes: well location, licence number, well name, licensee name, final drilling date, total depth, and true vertical depth. List is made available by the Alberta Energy Regulator (AER) - formerly the Energy Resources Conservation Board (ERCB).

Oil and Gas Facilities - ST102 & ST50 **OGF**

This list of batteries, gas plants, meter stations, and other facilities in the province of Alberta, made available as Reports ST102 (Parts A and B) and ST50 (A and B), is provided by the Alberta Energy Regulator (AER).

Pipeline Installations **PIPELINE INSTALL**

Pipeline installations associated with a pipeline licence in the approved oil and gas pipelines in Alberta made available by the Alberta Energy Regulator (AER). There may be line segments associated with the pipeline installation licence or it may be a standalone installation on a licence.

Surficial Geology of Alberta **SURFICIAL GEOLOGY**

This dataset, made available by Alberta Geological Survey, is a compilation of existing surficial map information for Alberta, edited for mapping continuity and generalized to make it suitable for presentation and use at 1:1,000,000 scale. It is the dataset used to create Alberta Geological Survey Map 601: Surficial Geology of Alberta.

Well Licenses **AERW**

Locations of Well Licenses made available by the Alberta Energy Regulator (AER) as ST37. Includes

Appendix

Active, Suspended, Abandoned, Drilled and Cased Oil, Gas, Crude Bitumen well licenses, as well as Observation, Injection, Disposal, and Undefined well licences.

Wetlands of Alberta **WETLAND**

The Alberta Merged Wetland Inventory depicts wetlands within the province of Alberta for the period 1998 to 2015 classified to the Canadian Wetland Classification System (CWCS) at the major class level: marsh, bog, fen, swamp, and open water. This database is made available by Alberta Environment and Parks.

Private Sources

Oil and Gas Wells **OGWW**

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Radon Zone Information **RADON**

The Radon Potential Map is developed by Radon Environmental Management Corporation. Its objective was to illustrate the relative variation of radon risk across the country, and in 2011 it published its first geologic Radon Potential Map of Canada.

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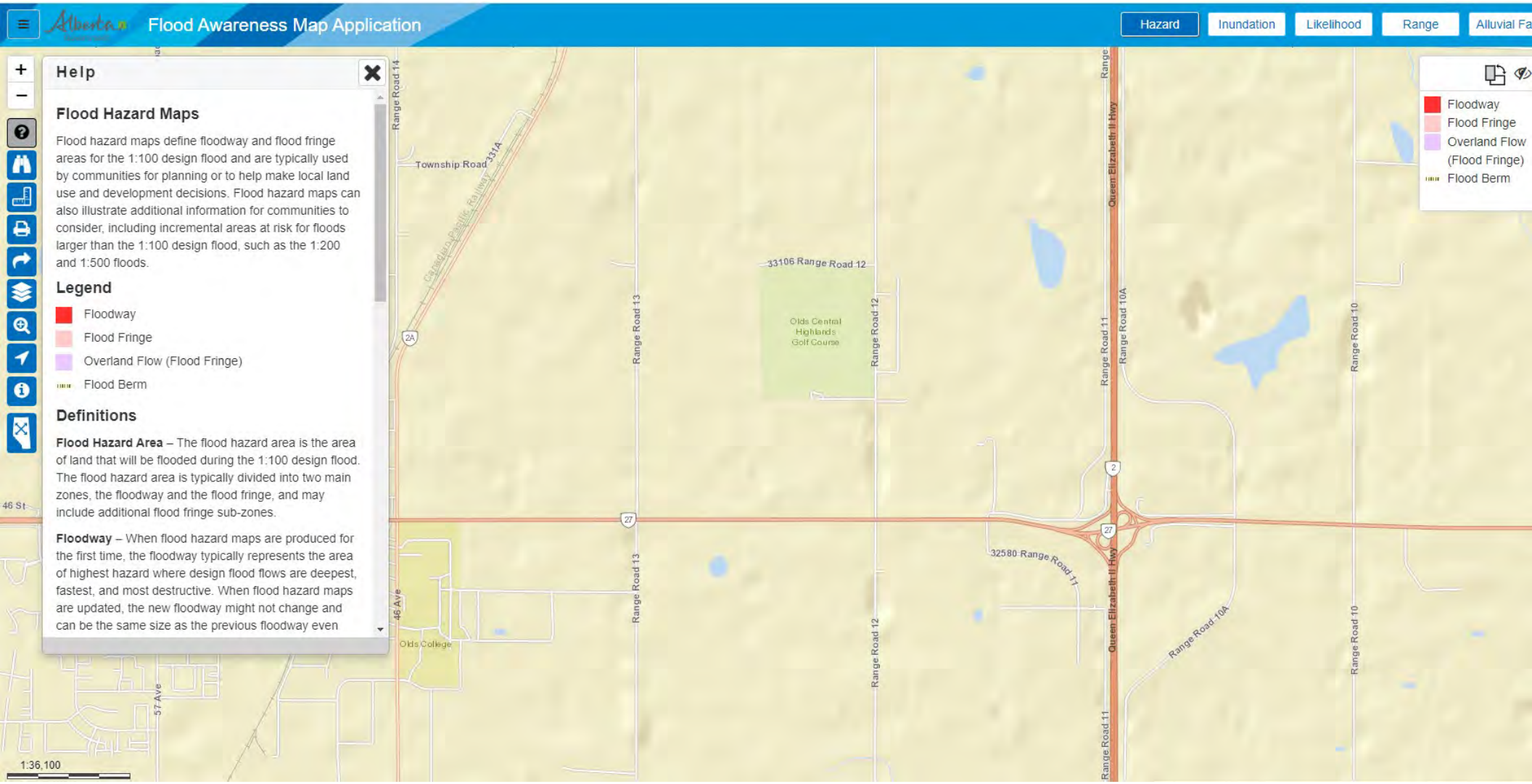
APPENDIX P

Alberta

Flood Hazards Map

Bifröst

Environmental and Remediation Services Inc.


Flood Awareness Map Application
Hazard
Inundation
Likelihood
Range
Alluvial Fa
Help
Flood Hazard Maps
Flood hazard maps define floodway and flood fringe areas for the 1:100 design flood and are typically used by communities for planning or to help make local land use and development decisions. Flood hazard maps can also illustrate additional information for communities to consider, including incremental areas at risk for floods larger than the 1:100 design flood, such as the 1:200 and 1:500 floods.
Legend
Floodway
Flood Fringe
Overland Flow (Flood Fringe)
Flood Berm
Definitions
Flood Hazard Area – The flood hazard area is the area of land that will be flooded during the 1:100 design flood. The flood hazard area is typically divided into two main zones, the floodway and the flood fringe, and may include additional flood fringe sub-zones.
Floodway – When flood hazard maps are produced for the first time, the floodway typically represents the area of highest hazard where design flood flows are deepest, fastest, and most destructive. When flood hazard maps are updated, the new floodway might not change and can be the same size as the previous floodway even
Floodway
Flood Fringe
Overland Flow (Flood Fringe)
Flood Berm
Range Road 14
Township Road 331A
Canadian Pacific Railway
33106 Range Road 12
Olds Central Highlands Golf Course
Range Road 13
Range Road 12
Range Road 11
Range Road 10A
Range Road 10
Queen Elizabeth II Hwy
32580 Range Road 11
46 St
46 Ave
57 Ave
Olds College
2A
27
2
1:36,100

APPENDIX Q

Utility Records –

Alberta One Call

Bifröst

Environmental and Remediation Services Inc.

No Records

No records were recovered (the category is applicable but the records do not exist), the records were not available (the category is applicable but the records are not available), or the records category was not applicable to this particular Phase I ESA Site.

APPENDIX R

Google Street View Photographs

Bifröst

Environmental and Remediation Services Inc.



R1. Project Site, looking northwest from the intersection of Highway 27 and Range Road 12.



R2. Typical view looking north of the Project Site showing agricultural fields.



R3. View of a road entry point into the Project Site on the southwest corner, looking north.



R4. View of the eastern property, looking northeast from the intersection of Highway 27 and Range Road 12.



R5. Drive into the farmstead to the south of the Project Site, on the eastern end, looking south.



R6. View of the farmstead plot and adjacent western agricultural fields to the south of the Project Site, looking southeast.



R7. Another view of the agricultural fields to the south and southwest of the Project Site, looking south from the western entry point along Highway 27.



R8. View of the agricultural fields to the west, looking northwest from the western entry point along Highway 27.

APPENDIX S

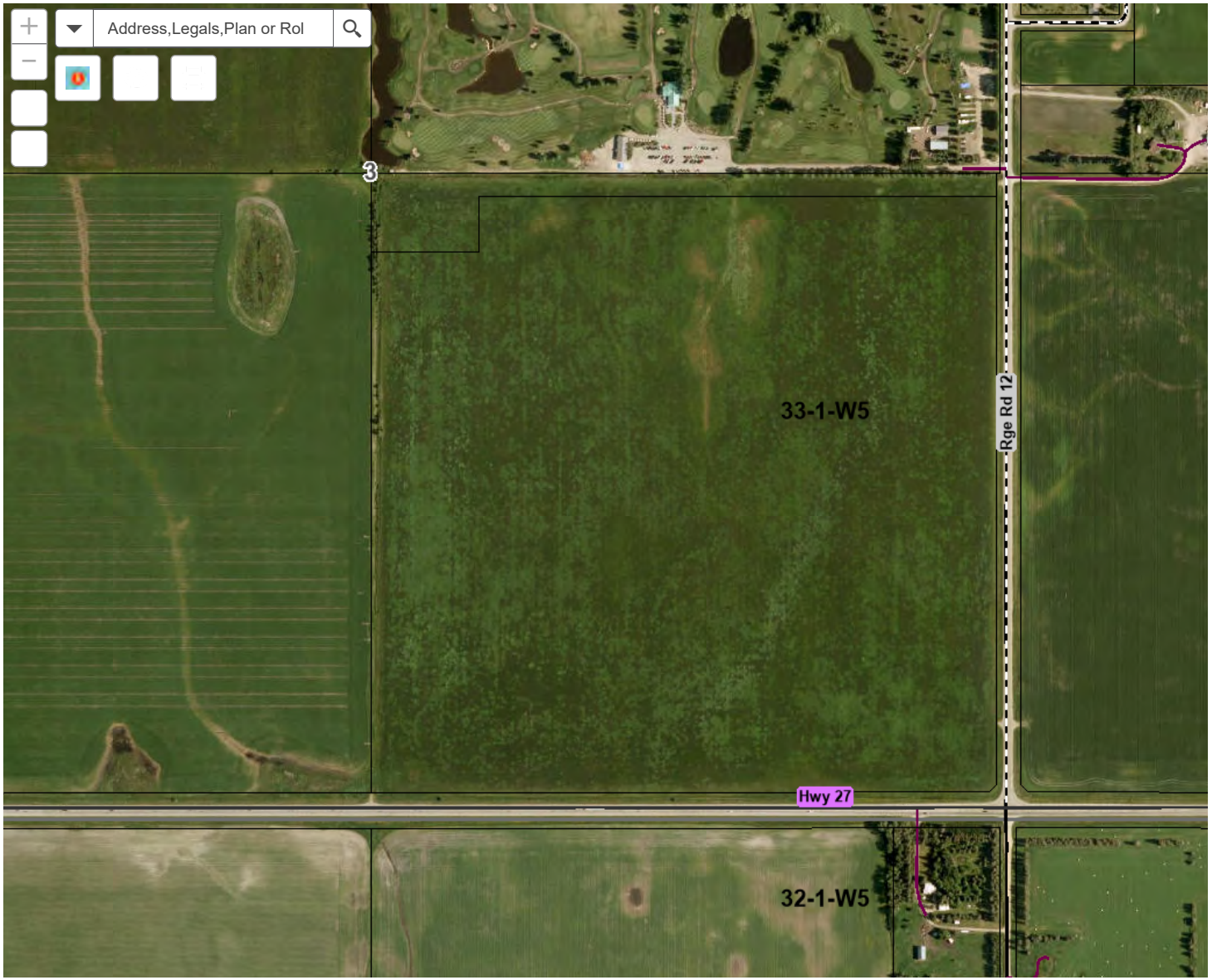
Web-Based Records

Bifröst

Environmental and Remediation Services Inc.

MVC Environmentally Significant Areas (ESA's)

Based on the 2008 Summit Report



Legend

MVC_EnvironmentalFeatures

Rivers and Creeks

mvcStreamClass

- Class C (Activity Restriction)
- Class D (No Activity Restriction)
- Unclassified

Towns/Village

Road - Primary/Secondary Highways

Parcels (PGIS)

Roads - Not MVC Owned

Roads - MVC Owned

Road Surface Class

- chip sealed
- gravel
- paved
- unimproved

Roads - Outside County

Section Number Grid

200m

-114.048 51.800 Degrees

All rights reserved

APPENDIX T

Photograph Log

Bifröst

Environmental and Remediation Services Inc.



1. The Project Site and a representative view from the southern side of the property along Highway 27, facing north.



2. View to the east along Range Road 12 of the southeastern Project Site access point, from within the property.



3. View to the south along Range Road 12 of the northeastern Project Site access point.



4. View to the south along Highway 27 of the southwestern Project Site access point, from within the property.



5. View from the grasses and other vegetation within the southern Project Site ditch.



6. View of the ditch (upper right of the photograph) along the western property boundary, facing north, that contains small trees.



7. The ditch along the northern boundary of the Project Site, which is filled with water and water-tolerant plants, facing south east.



8. View to the north along Highway 27 of the southwestern corner of the Project Site, showing a buried water line sign.



9. View north along Highway 27 of the southwestern corner of the Project Site, showing a buried fiber optic line sign.



10. View of a buried telephone cable sign along Range Road 12 in the southeastern corner of the Project Site; photograph taken facing north.



11. View of the monitoring well located in the northcentral portion of the Project Site; photograph taken facing north.



12. View of the geotechnical stand pipe piezometer located in the northcentral portion of the Project Site; photograph taken facing east.



13. View to the south along the northern Project Site boundary. The change in vegetation type past the tree indicates the location of the drainage ditch.



14. View to the south along the northern Project Site boundary. The change in vegetation type is clear and indicates the location of the drainage ditch.



15. View of the northwestern corner of the Project Site and Block A, showing the ditch and tree growth on this corner; photograph taken facing southwest.



16. View facing south west of the water line that runs from the pump house on Location 2 to the southern property line along the western property boundary.



17. View to the power lines along Highway 27 on the southern side of the Project Site access; photograph taken facing east.



18. View of the main entrance to the Olds Golf Club, west of Range Road 12; photograph taken facing northwest.



19. A pair of solid waste dumpsters at the Olds Golf Club, near the entrance off of Range Road 12; Photograph taken facing north.



20. Entrance to the maintenance area at the Olds Golf Club; photograph taken facing northwest.



21. Close up view of the ASTs (arrows) located within one of the sea cans; photograph taken facing northwest.



22. View of the Project Site to the south; drainage from the parking lot has created a wet area adjacent and into the Project Site.



23. View of the grasses and other vegetation within the drainage ditch flowing west, on the northern Project Site boundary; Photograph taken facing southwest.



24. View of the clubhouse on the Olds Golf Course; photograph taken facing north.



25. View of the pole-mounted transformers (arrow) located on the Olds Golf Course property; (arrow); photograph taken facing west.



26. View of the golf cart battery charging building; photograph taken facing west.



27. View of the AST (arrow) located on the west side of the battery charging building; photograph taken facing northeast.



28. Debris pile north of the Project Site on the Olds Golf Course property; photograph taken facing south.



29. Pump house and pole-mounted transformer located on the Olds Gold Course property; photograph taken facing west.



30. View of what appears to be a former concrete retaining wall, north of the Project Site; photograph taken facing southeast.



31. Close up view of the pipeline (arrows) leading from the pump house on the Olds Golf Course property; photograph taken facing southwest.



32. View of the farmstead (Location 3) to the northeast of the Project Site; Location 4 can be seen in the background; photograph taken facing east.



33. View of the agricultural lands associated with Location 5 (arrow), across Range Road 12; photograph taken facing southeast.



34. View of Location 6 to the southeast (arrow), to the left of the large trees; photograph taken facing south.



35. View of Location 7 to the south (arrow); photograph taken facing south.



36. View of Location 8 to the south (arrow); photograph taken facing south.



37. View of Location 10 to the west; photograph taken facing west.

APPENDIX U

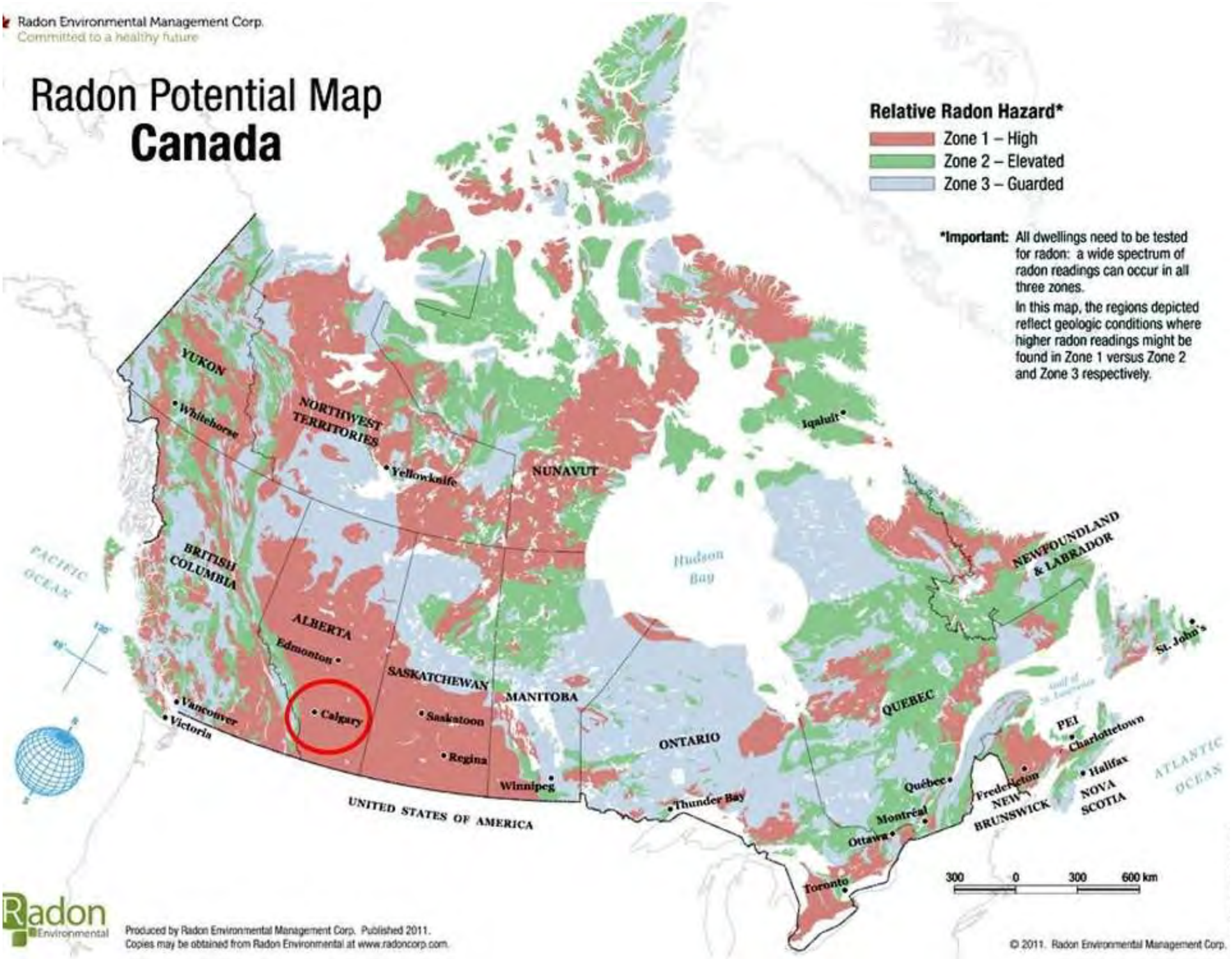
Radon Map

Bifröst

Environmental and Remediation Services Inc.

Radon Environmental Management Corp.
Committed to a healthy future

Radon Potential Map
Canada



Radon Environmental

Produced by Radon Environmental Management Corp. Published 2011.
Copies may be obtained from Radon Environmental at www.radoncorp.com.

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APPENDIX V

Geophysical Surveys

Bifröst

Environmental and Remediation Services Inc.

February 13, 2024

Bifröst Environmental and Remediation
340 Midpark Way SE
Suite 300,
Calgary, Alberta T2X 1P1

Attention: Mark Lehar, P.Geo

RE: Geophyical Surveys at 07-03-033-01 W5 and 08-03-033-01 W5 , OLDS , ALBERTA

INTRODUCTION

Focused Geo was retained by ***Bifröst Environmental and Remediation*** to conduct a geophysical investigation at the above mentioned locations with the objective of finding evidence of previous industrial activity on the site, namely oil well work and determining the position of capped well if present. 07-03-033-01 W5 had a well which was abandoned,while 08-03-033-01 W5 has evidence of possible industrial activity as determined by analysis of aerial photography.

To realize the above objective an Overhauser magnetometer (MAG) and electromagnetic terrain conductivity (EM) survey were completed. MAG and EM surveys are useful for locating metals and imaging soil characteristics. The geophysical investigation was conducted on February 7 , 2024.

METHODOLOGY

The survey involved systematic grid-based scans using the Overhauser magnetometer (MAG) to identify and locate metal objects based on magnetic anomalies. Simultaneously, the electromagnetic terrain conductivity (EM) meter measured subsurface conductivity variations, providing insights into soil composition. Data collection included magnetic field strength, conductivity values and spatial coordinates.

Overhauser Magnetometer

The SmartMag Overhauser Magnetometer used for this survey is a geophysical instrument designed for measuring the Earth's magnetic field with high precision. The instrument operates based on the Overhauser effect, a quantum physics phenomenon involving the transfer of polarization between

electrons and nuclei in a magnetic field. The Overhauser effect provides high sensitivity, allowing the SmartMag Magnetometer to detect even subtle variations in the Earth's magnetic field caused by nearby magnetic materials or geological features.

Electromagnetic Terrain Conductivity Meter

The EM31-SH conductivity meter employed in this survey is manufactured by Geonics Ltd. The EM31-SH operates on the principle of electromagnetic induction. It emits a primary electromagnetic field into the ground, inducing secondary currents in conductive subsurface materials. The instrument measures the conductivity of the subsurface materials based on the response of the induced currents. Conductive materials, such as metals or saline solutions, affect the strength and phase of the secondary electromagnetic field. The EM31-SH features a dual coil configuration. One coil serves as a transmitter, emitting the primary field, while the other coil acts as a receiver, detecting the secondary electromagnetic field. This configuration enhances sensitivity and accuracy in conductivity measurements.

The EM31-SH has a field of influence of 4 m, which is the effective depth of investigation. The resultant electrical field is recorded as the ***apparent conductivity*** in milliSiemens/meter (mS/m). The Siemen is the SI unit of measurement for volume of electrical conductance and is equivalent to an Ampere/Volt. The EM31-SH simultaneously records the conductivity (quadrature phase) and magnetic susceptibility (in-phase) components of the electrical field.

DATA ACQUISITION AND PROCESSING

EM Terrain Conductivity Survey and Magnetometer

The EM31-SH is carried at about hip level (~1m above surface) while the SmartMag Magnetometer sensor is strapped to a survey rod on a backpack with a control sensor in the front for user input and monitoring. The area of interest was walked in a serpentine pattern while attempting to keep about 8 – 10 m between passes, with a sample value of collected every 1 second. About 2600 samples were collected for each survey.

Global Positioning System (GPS)

A Juniper Systems Geode GNSS receiver (GNS2) was used for all recorded data collection activities. The Geode GNS2 provides sub-meter accuracy with SBAS correction services.

Processing

The collected point data is spatially extrapolated from to a uniform grid of 1m x 1m through the statistical methodology of Kriging which accounts for both the trend (systematic spatial variation) and the spatial dependence (correlation between nearby points). Some data editing occurs prior to Kriging, such as filtering points closer that 1 m together and removing values which are > 3 x the standard deviation from the mean.

RESULTS

Three plots, apparent conductivity, inphase and magnetometer readings collected and extrapolated over the areas of interest, 07-03-033-01 W5 and 08-03-033-01 W5 are presented in the figures section (see below). ***Figure 1: apparent conductivity for 07-03-033-01 W5*** has a range of conductivity from 5 – 50 ms/m. There were two pipes located on the site and have been marked on the figure. One looked like a monitoring well with metal housing while the second was a simple 3" diameter PVC pipe protruding from the ground (see illustrations 1 and 2). ***Figure 2: INPHASE response for 07-03-033-01 W5 and Figure 3: Total Magnetic Field*** both display heterogeneous responses suggesting disturbed subsurface conditions while the Total Magnetic Field has an anomaly which corresponds to the location of the abandoned well as documented by the Government of Alberta. (https://extmapviewer.aer.ca/AERAbandonedWells/Index.html, well licence: 0072245)

Figure No. 4 – 6 provide the conductivity, inphase and magnetic field data collected over ***08-03-033-01 W5***. The data, overall is much more uniform than the data collected at *07-03-033-01 W5* with the apparent conductivity ranging from 7- 18 mS/m and the total magnetic field ranging from 55638 – 55657 nT vs 50538 – 58867 nT at *07-03-033-01 W5.* There is an anomaly at UTMz11: E703339, N5742994 which appears on all three plots, however the sensitivity of each of these instruments when in uniform site conditions should be taken into account when ascribing the cause.



Illustration 1: "monitoring well" located with 07-03-033-01W5 (see Figure 1-3 for location)



Illustration 2: 3" PVC pipe protruding from ground located within 07-03-22-01W5. (See Figures 1-3 for location)

CONCLUSIONS

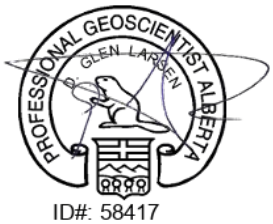
07-03-033-01 W5 has yielded geophysical data consistent with an area that has experienced soil disturbance caused by well site drilling activity. The magnetometer data has provided a reasonably strong anomaly which coincides with the documented location of the oil well location, however the presence of "monitoring well" on site, 20 m to the northeast of the documented location, needs to be further explained as to it's function. Is it possible the "monitoring well" actually leads to the well cap? The geophysical data at *08-03-033-01 W5* provided more uniform results which suggested little subsurface disturbance in spite of the aerial imagery which indicated poor vegetation growth. The low conductivity values recorded at this location would be consistent with sandy/dry soils which may account for the dearth of vegetation. The one anomaly at UTMz11: E703339, N5742994 is deemed to be too subtle to be attributed to a buried well casing, however investigating the surface once the snow melts may be worthwhile to look for possible causes.

CLOSURE

This report has been prepared with generally accepted geophysical practices for the exclusive use of ***Bifröst Environmental and Remediation***. The reported information is believed to provide a reasonable representation and interpretation of the geophysical data limited to the capabilities of the instrumentation employed, however, intrusive investigations are required to confirm the geophysical interpretations.

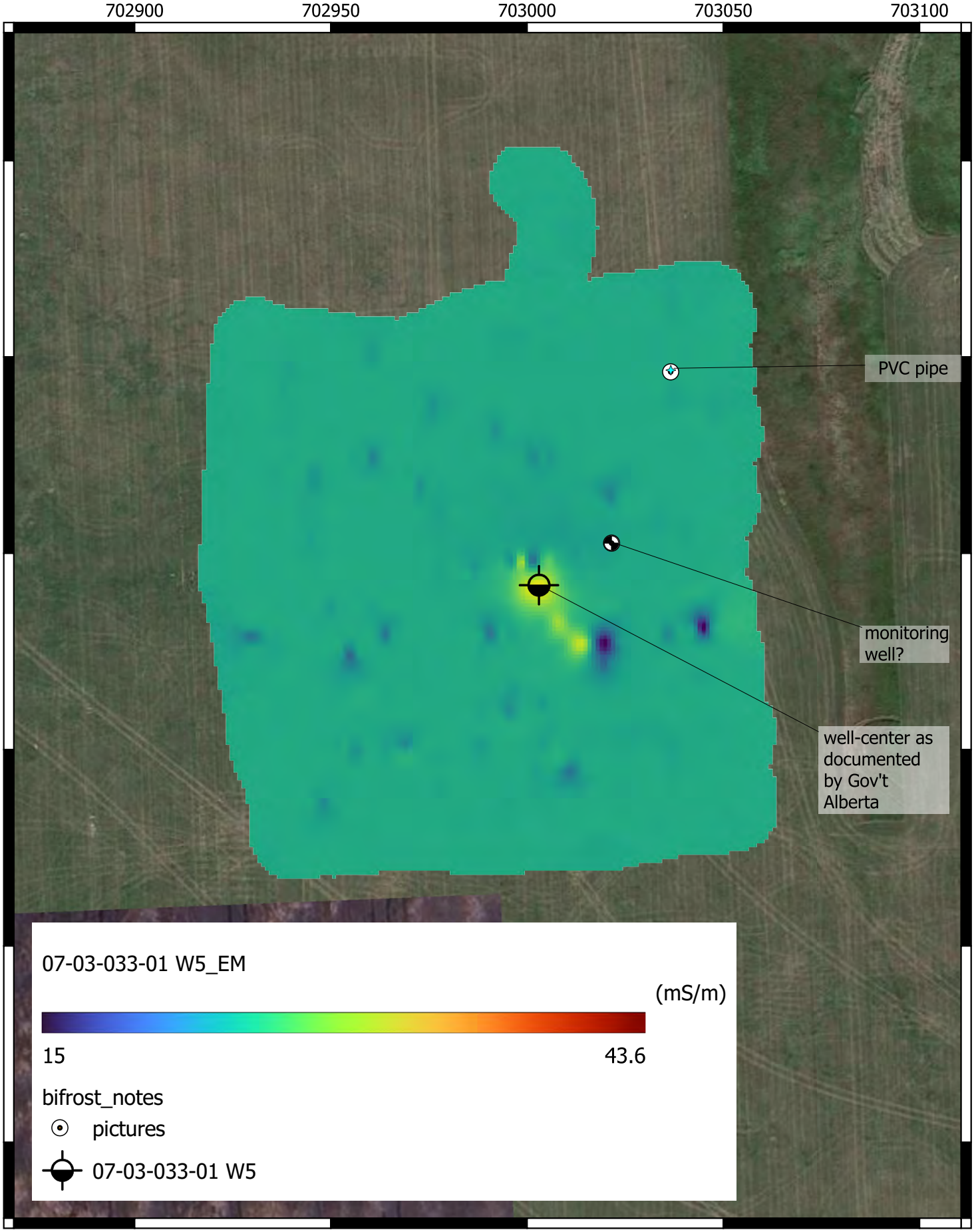
We trust this meets with your present requirements. If there should be any further inquiries please do not hesitate to contact the undersigned.

Respectfully submitted,

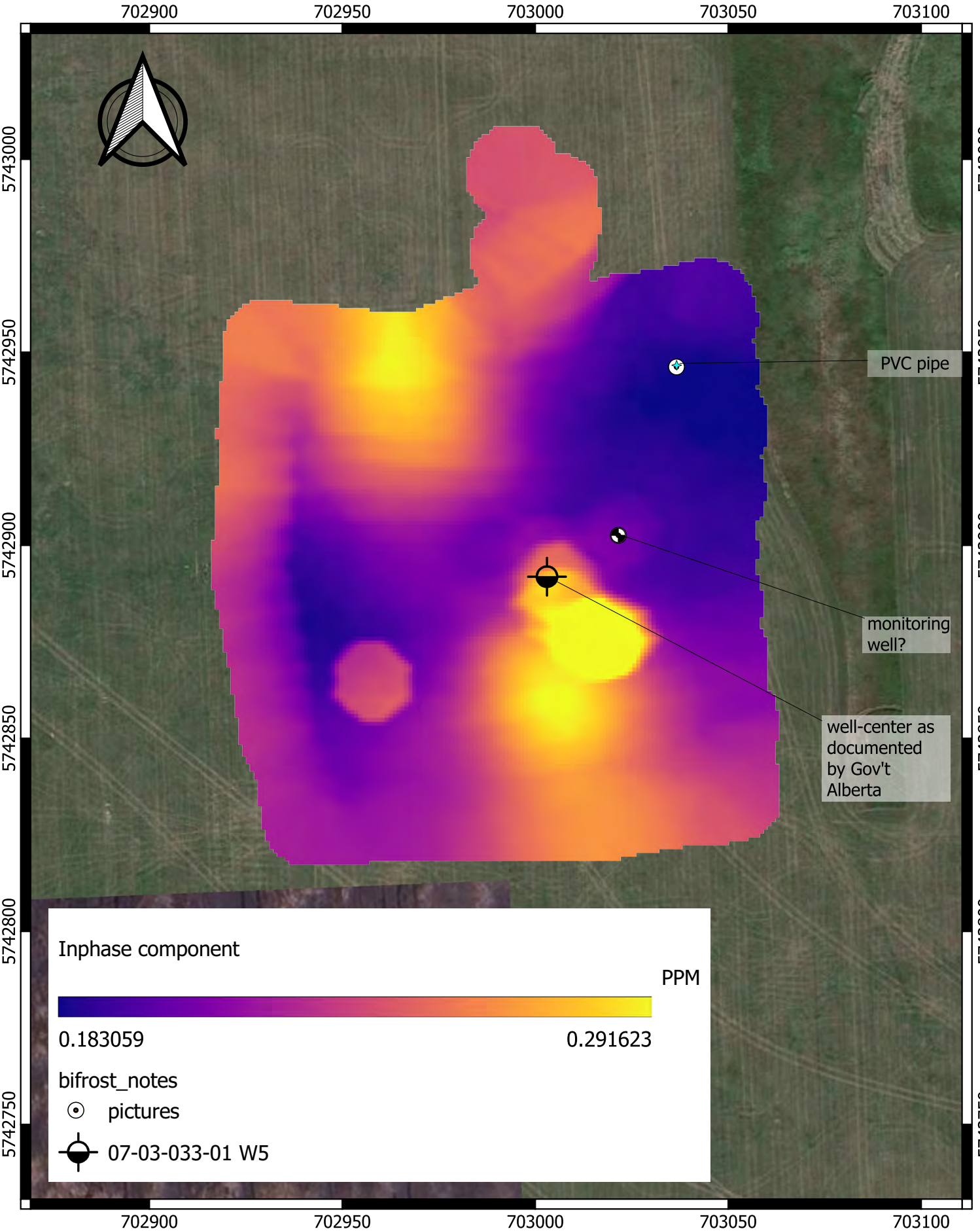


D. Glen Larsen, Principal
Focused Geo
403-390-8173

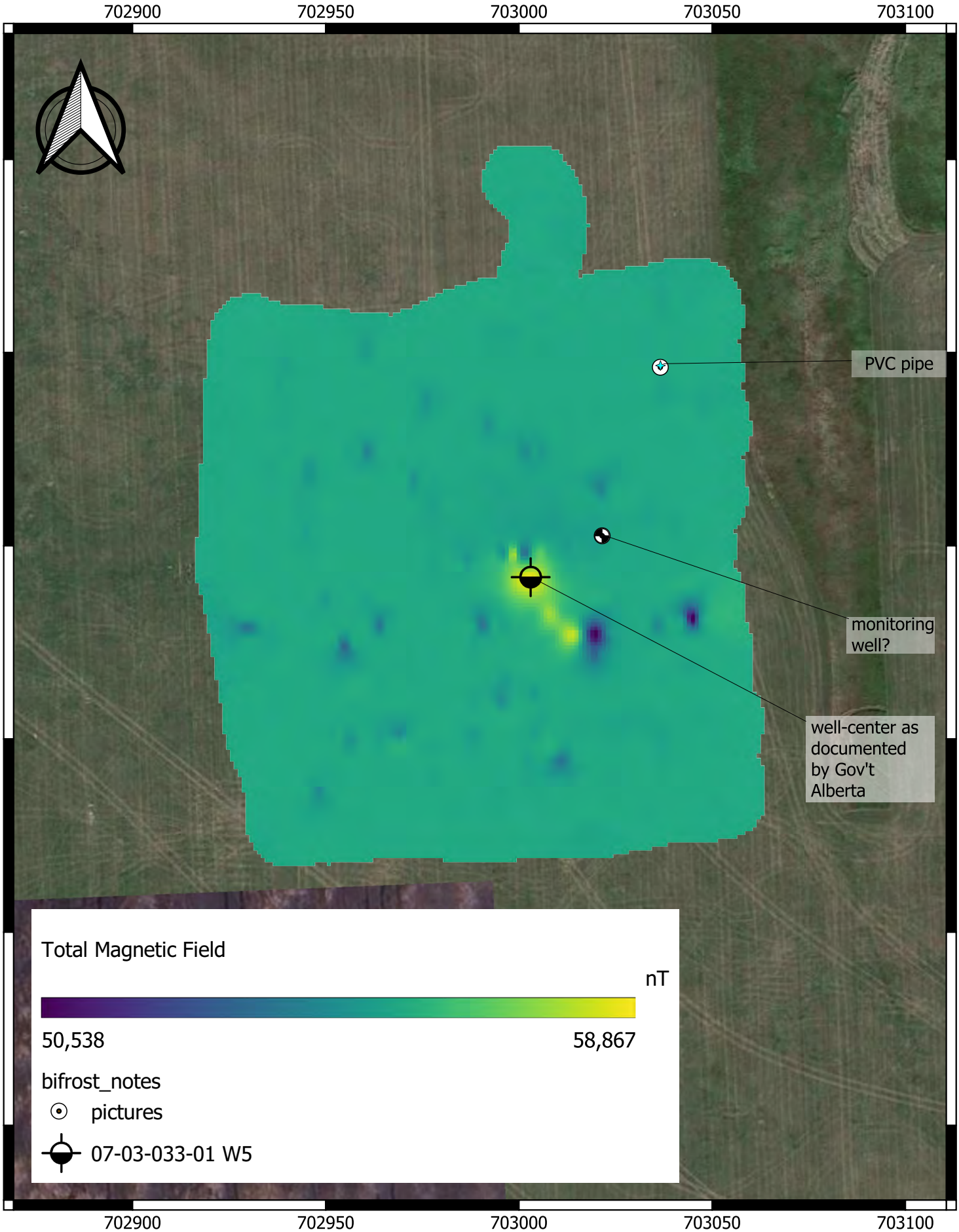
FIGURES



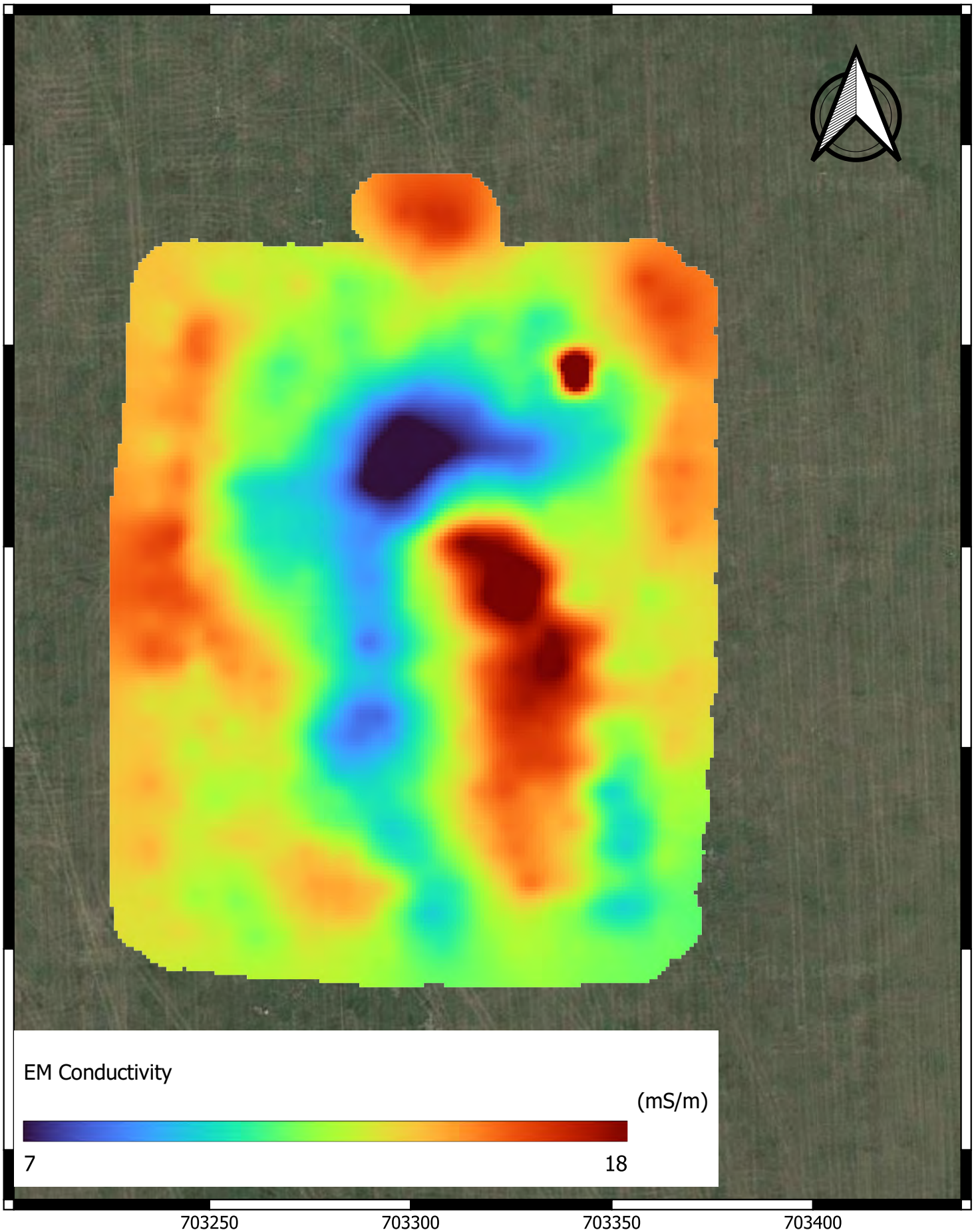
Data Acquired By: FOCUSEDgeo near-surface geophysics	Project No. 069 Survey Date: Feb 7, 2024 Surveyed By: GL Scale: 1:1250	**Figure No. 1** **EM31 - CONDUCTIVITY** **07-03-033-01 W5** **Olds, Alberta**	*Client:* Bifröst Environmental and Remediation Services Inc.



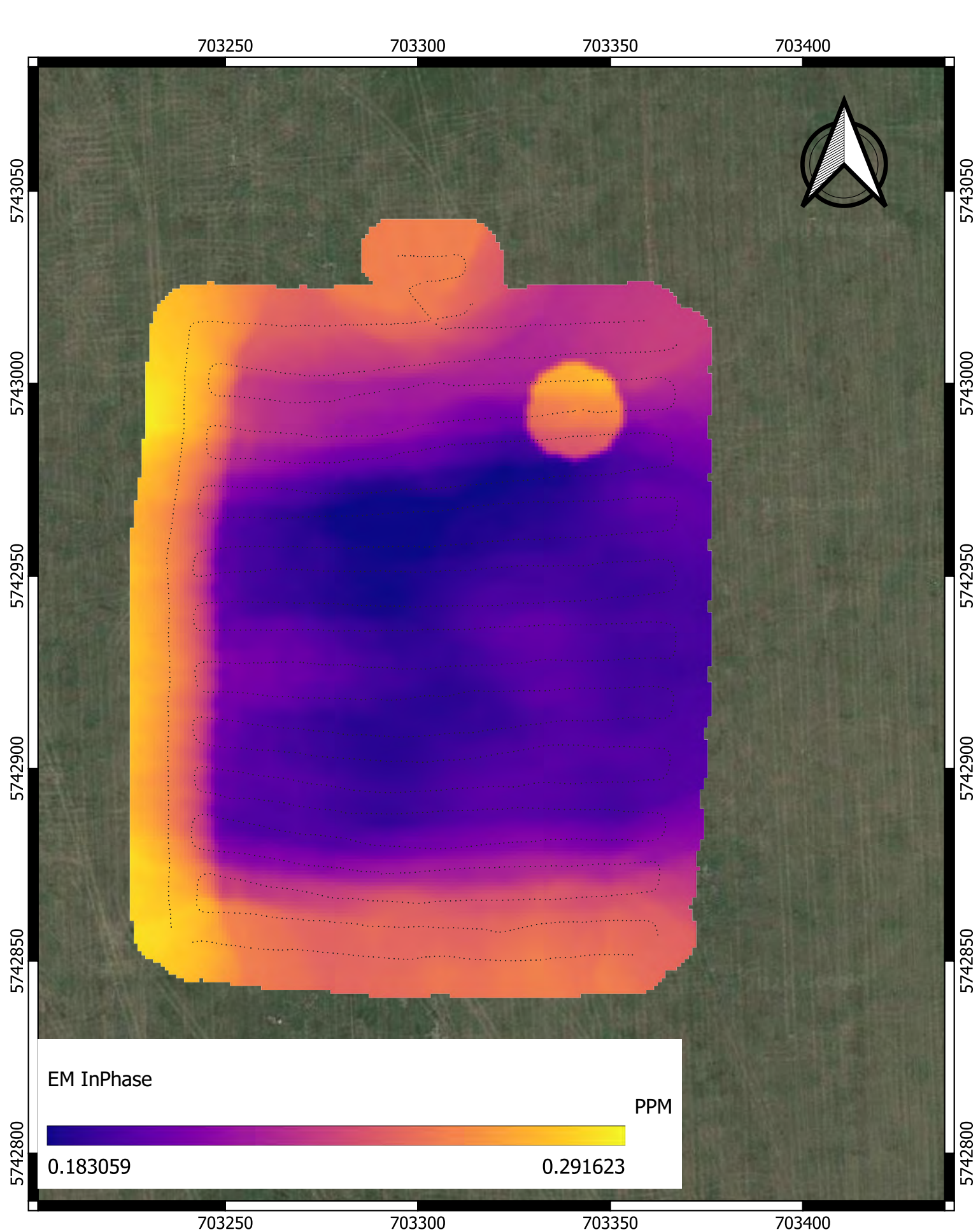
Data Acquired By: FOCUSEDgeo near-surface geophysics	Project No. 069 Survey Date: Feb 7, 2024 Surveyed By: GL Scale: 1:1250	**Figure No. 2** **EM31 - INPHASE** **07-03-033-01 W5** **Olds, Alberta**	*Client:* Bifröst Environmental and Remediation Services Inc.



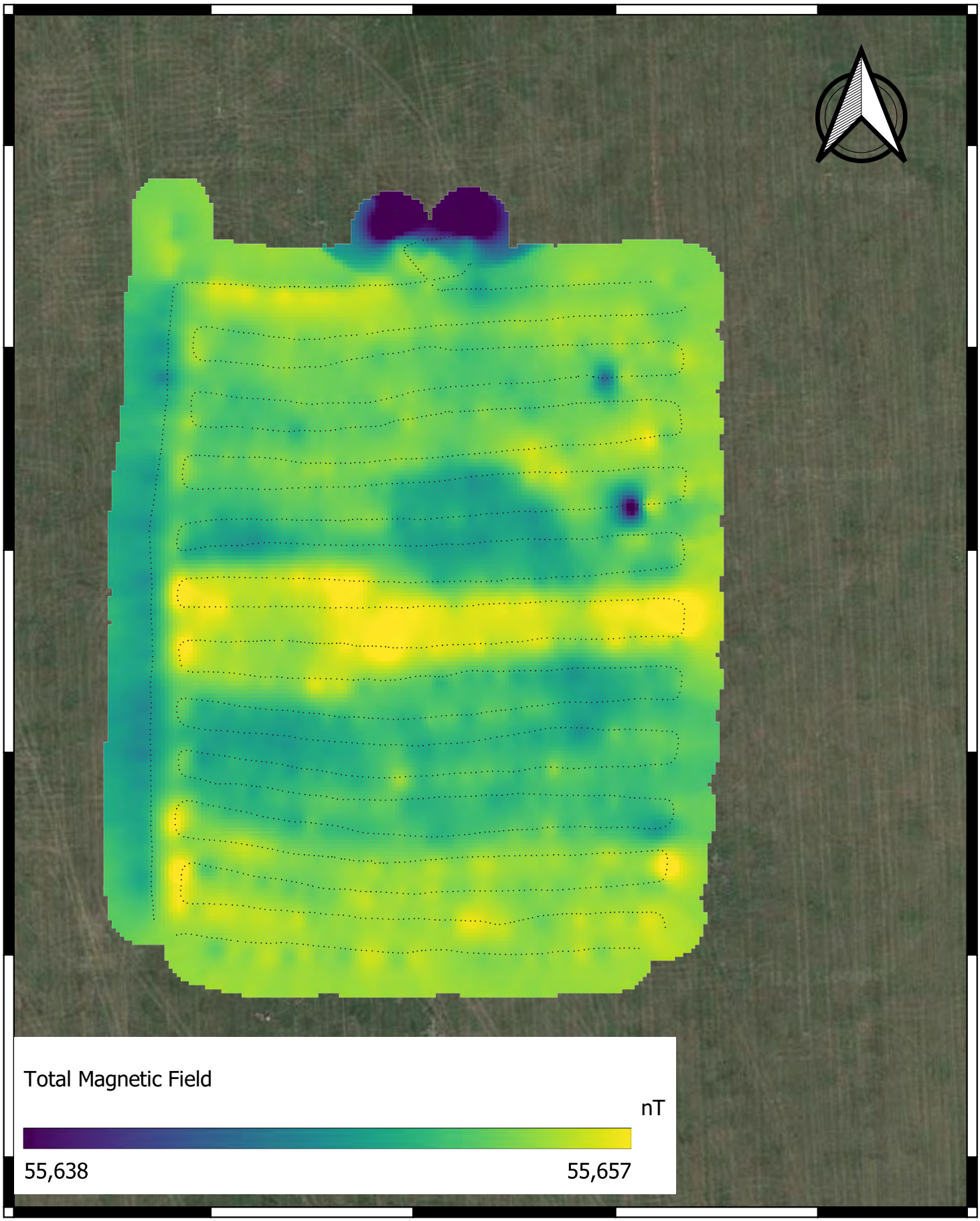
Data Acquired By: FOCUSEDgeo near-surface geophysics	Project No. 069 Survey Date: Feb 7, 2024 Surveyed By: GL Scale: 1:1250	**Figure No. 3** **Total Magnetic Field** **07-03-033-01 W5** **Olds, Alberta**	*Client:* Bifröst Environmental and Remediation Services Inc.



Data Acquired By: FOCUSEDgeo near-surface geophysics	Project No. 069 Survey Date: Feb 7, 2024 Surveyed By: GL Scale: 1:1250	**Figure No. 4** **EM - CONDUCTIVITY** **08-03-033-01 W5** **Olds, Alberta**	*Client:* Bifröst Environmental and Remediation Services Inc.



Data Acquired By: FOCUSEDgeo near-surface geophysics	Project No. 069 Survey Date: Feb 7, 2024 Surveyed By: GL Scale: 1:1250	**Figure No. 5** **EM - INPHASE** **08-03-033-01 W5** **Olds, Alberta**	*Client:* Bifröst Environmental and Remediation Services Inc.



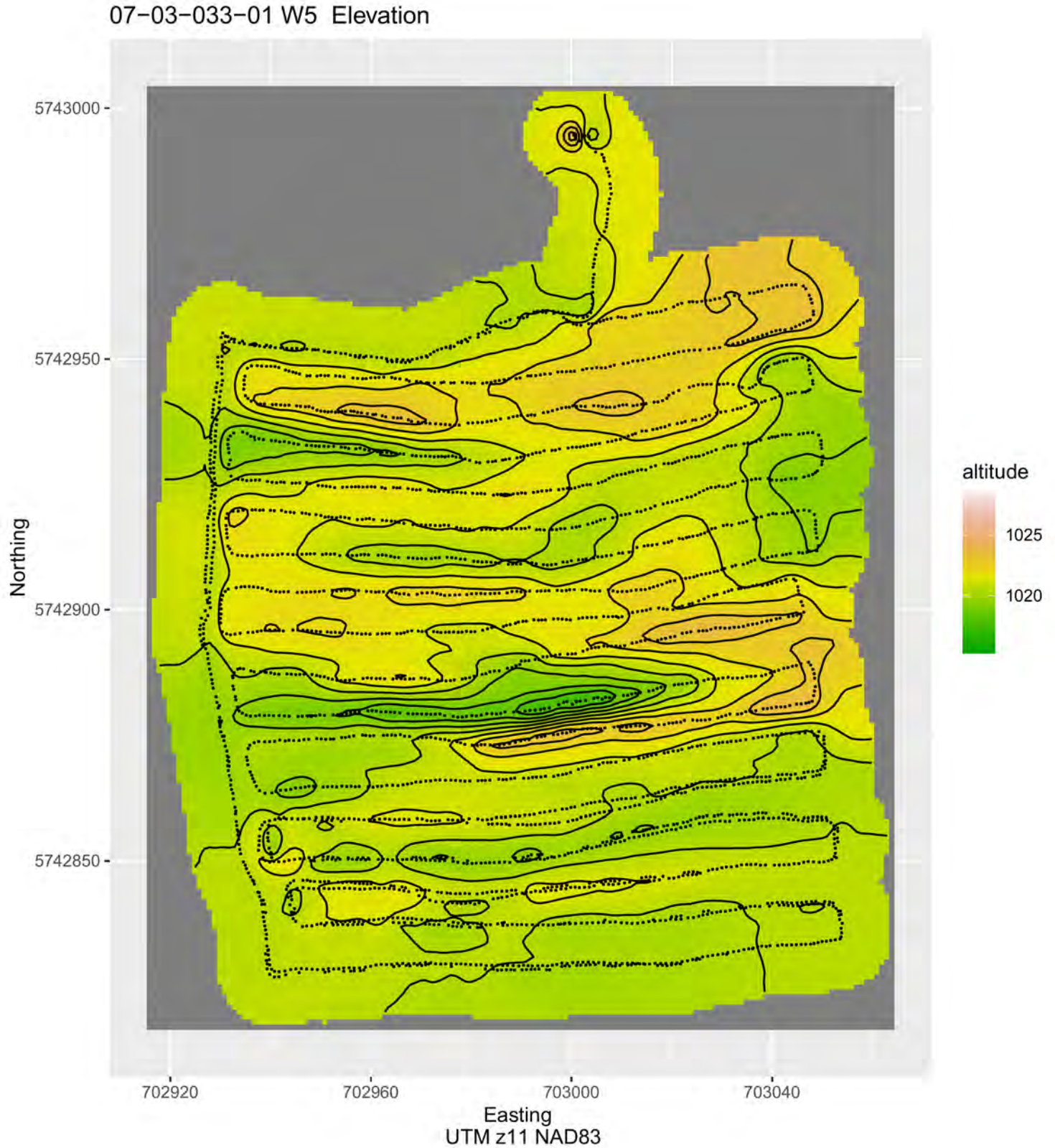
Data Acquired By: FOCUSEDgeo near-surface geophysics	Project No. 069 Survey Date: Feb 7, 2024 Surveyed By: GL Scale: 1:1250	**Figure No. 6** **Total Magnetic Field** **08-03-033-01 W5** **Olds, Alberta**	*Client:* Bifröst Environmental and Remediation Services Inc.

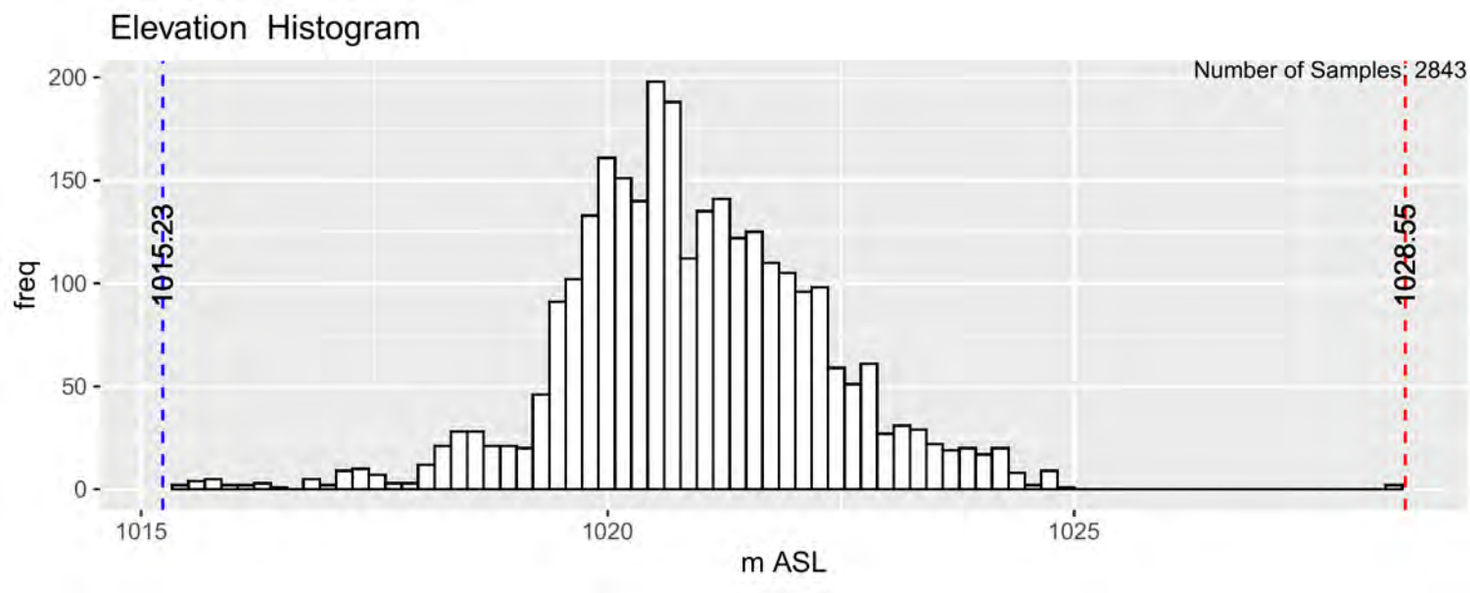
APPENDIX V1

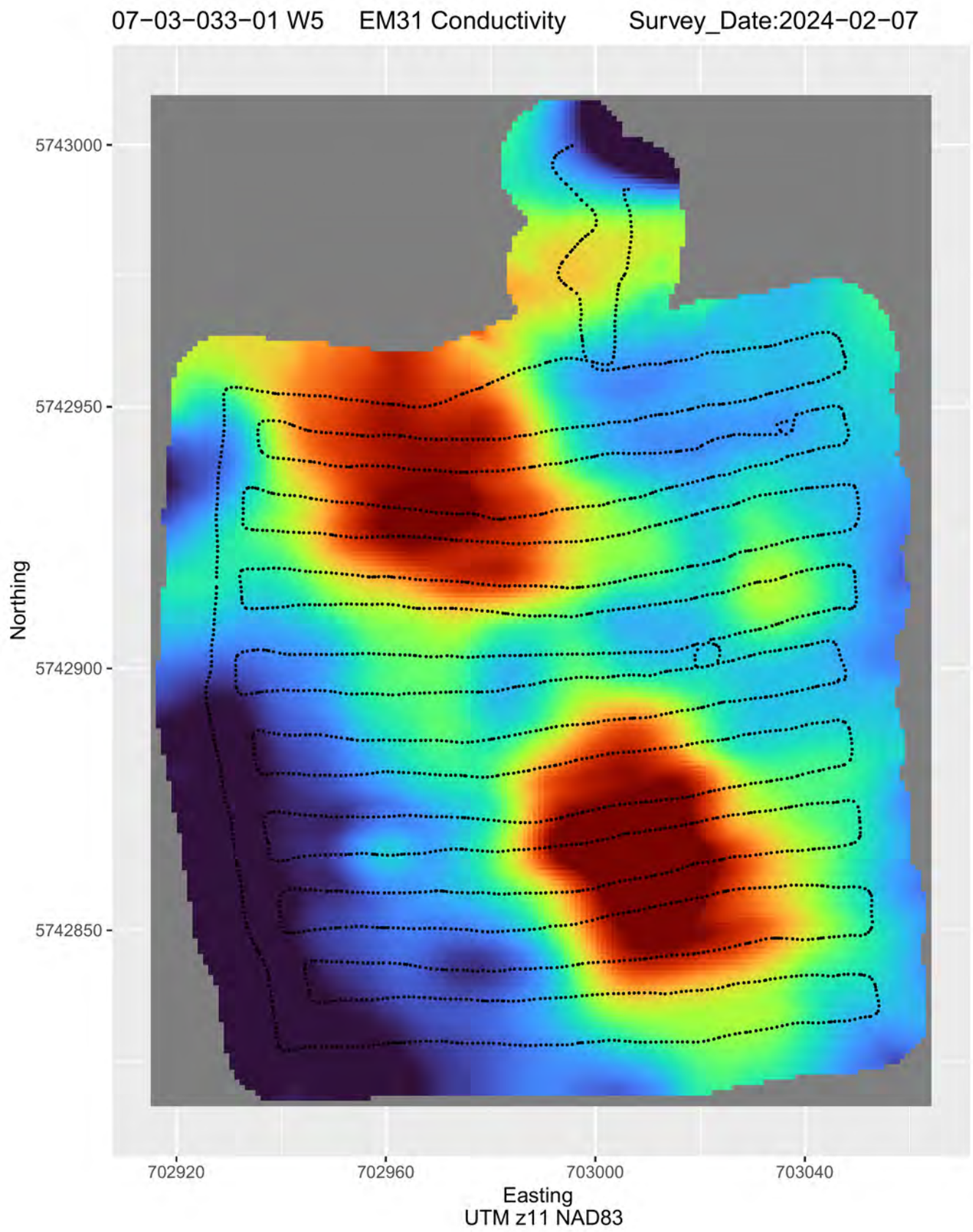
Geophysical Survey - LSD 7

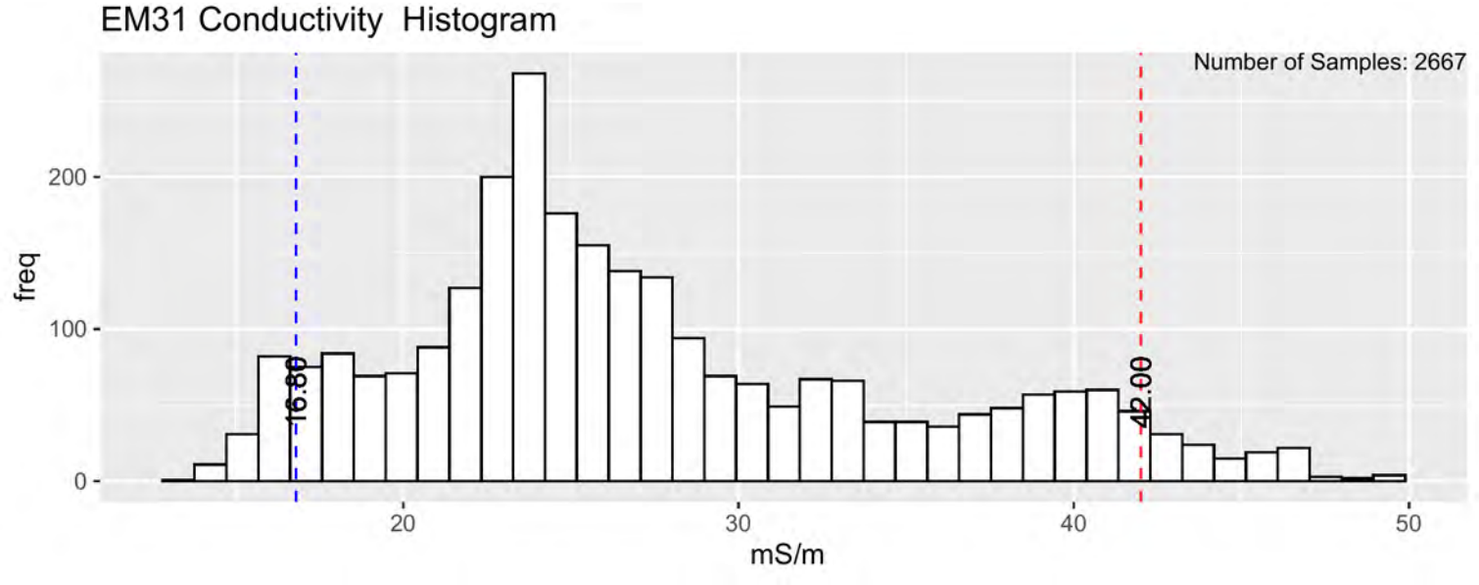
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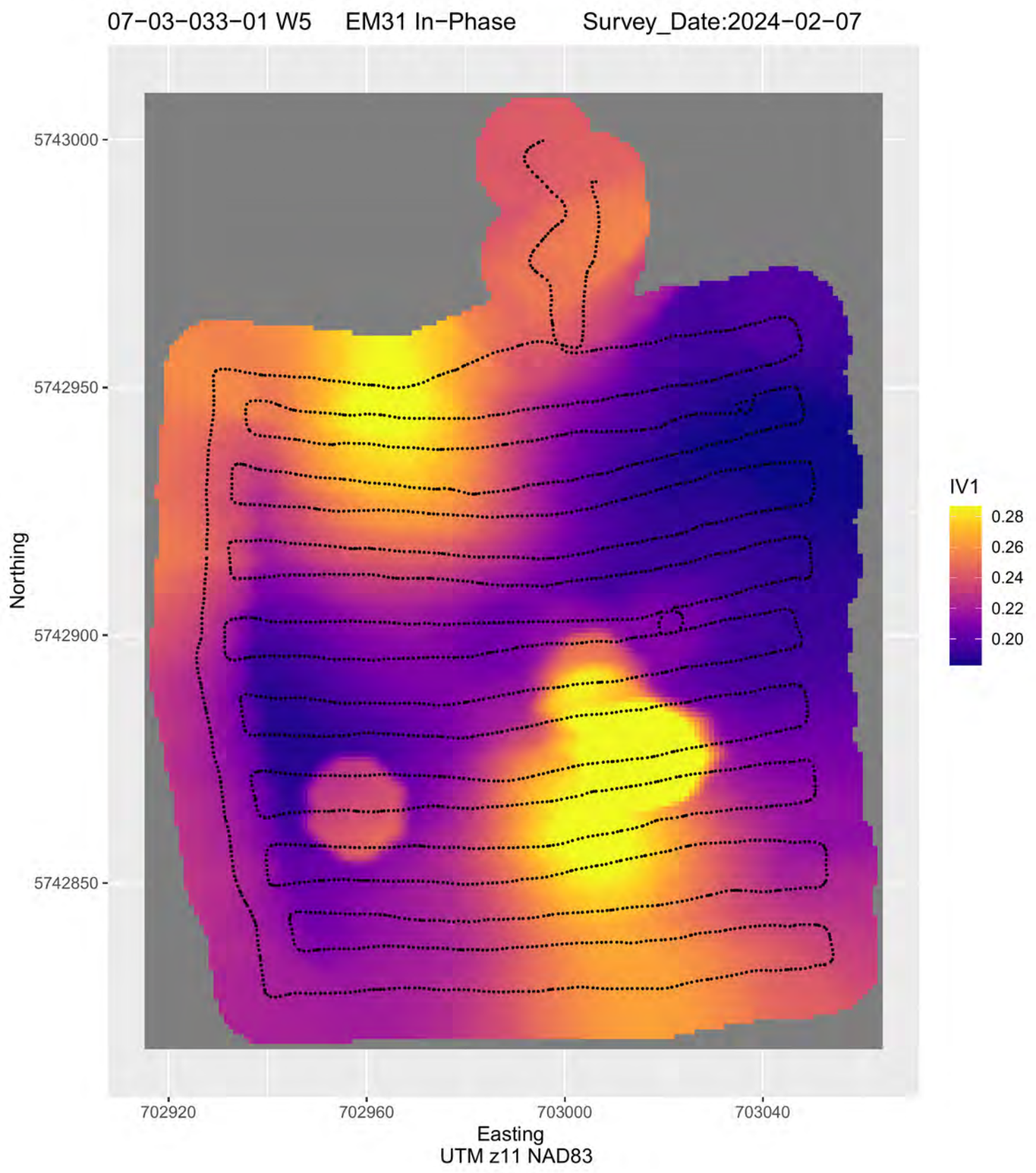
Environmental and Remediation Services Inc.

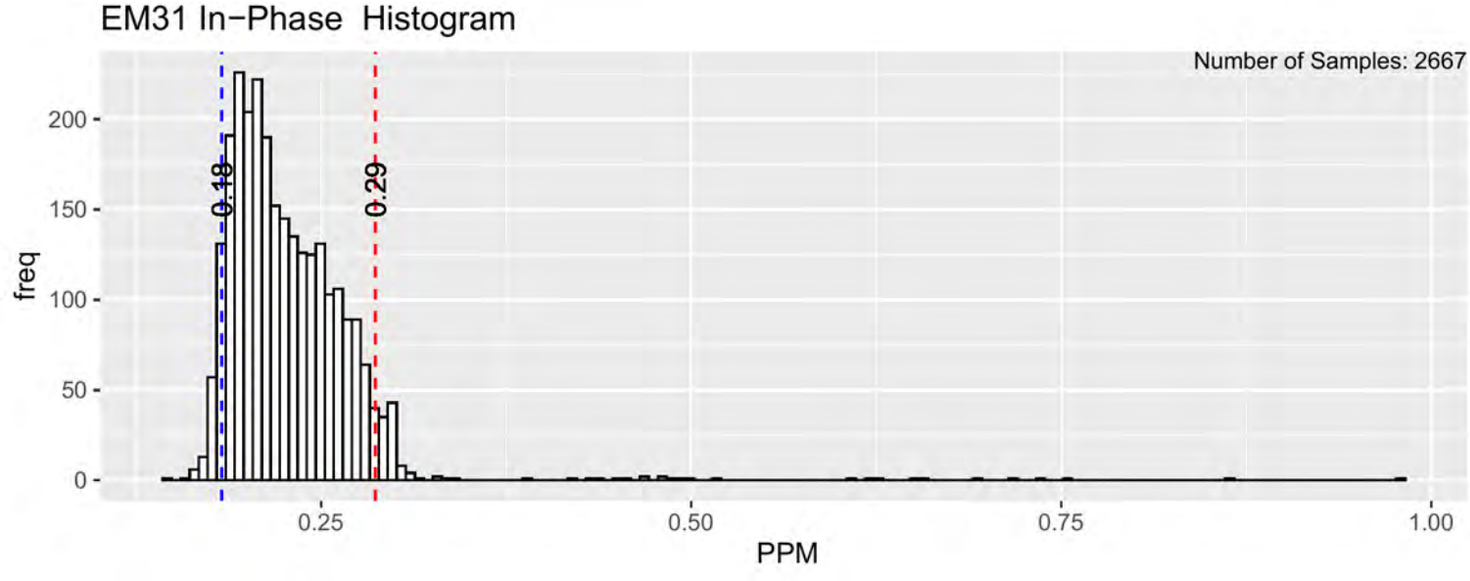

07−03−033−01 W5 Elevation
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5742850
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702960
703000
703040
Easting
UTM z11 NAD83

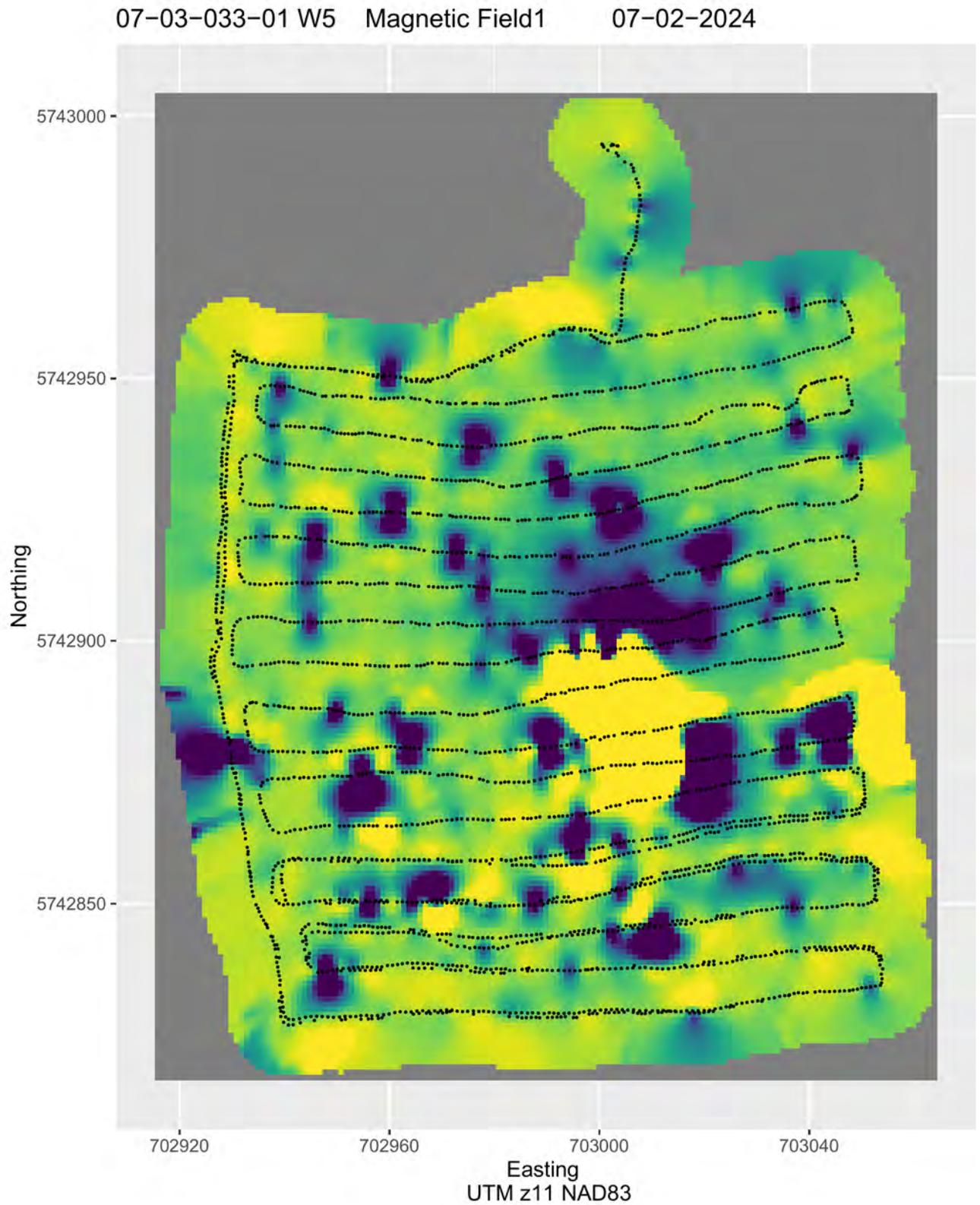

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50
0
freq
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1028.55
1015
1020
1025
m ASL

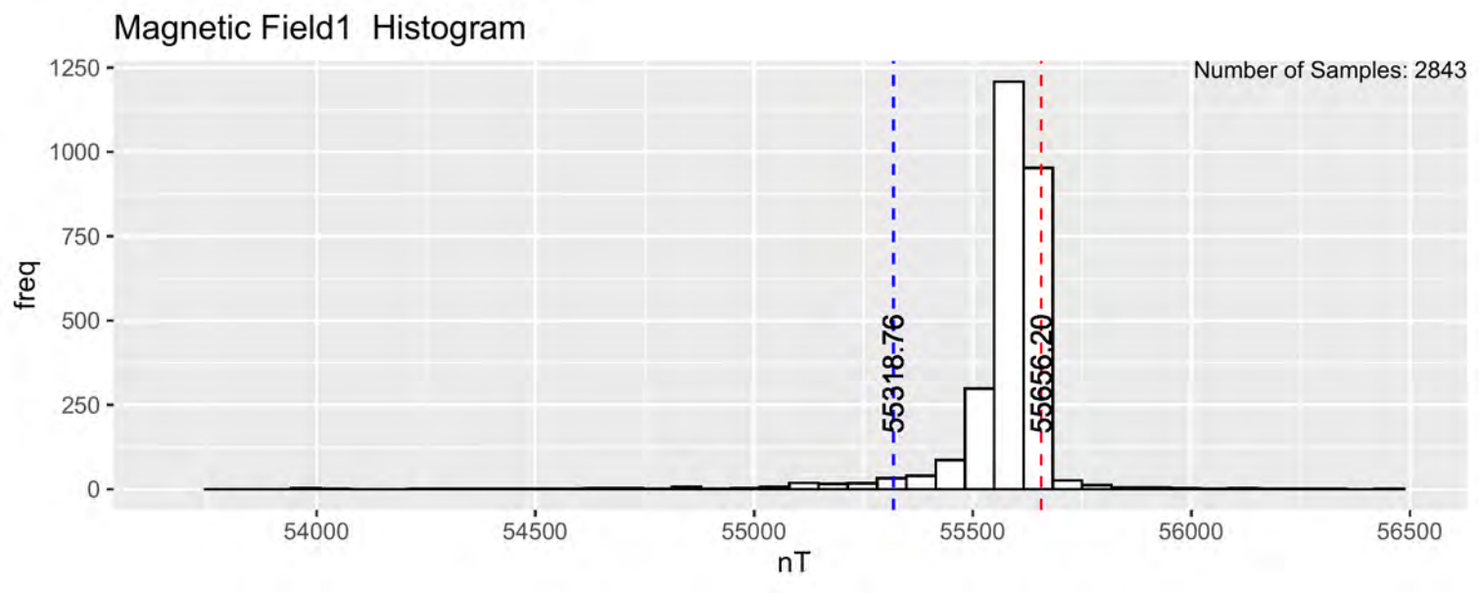

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5742900
5742850
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35
30
25
20
702920
702960
703000
703040
Easting
UTM z11 NAD83


EM31 Conductivity Histogram
Number of Samples: 2667
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100
0
freq
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42.00
20
30
40
50
mS/m


07-03-033-01 W5 EM31 In-Phase Survey_Date:2024-02-07
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Easting
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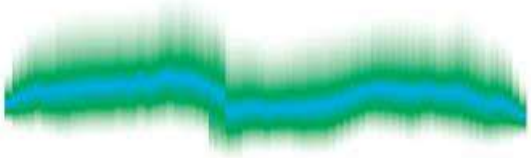

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100
50
0
freq
0.25
0.50
0.75
1.00
PPM


07−03−033−01 W5 Magnetic Field1 07−02−2024
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5742950
5742900
5742850
Northing
Field1
55600
55500
55400
702920
702960
703000
703040
Easting
UTM z11 NAD83


Magnetic Field1 Histogram
Number of Samples: 2843
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500
250
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freq
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55656.20
54000
54500
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56000
56500
nT

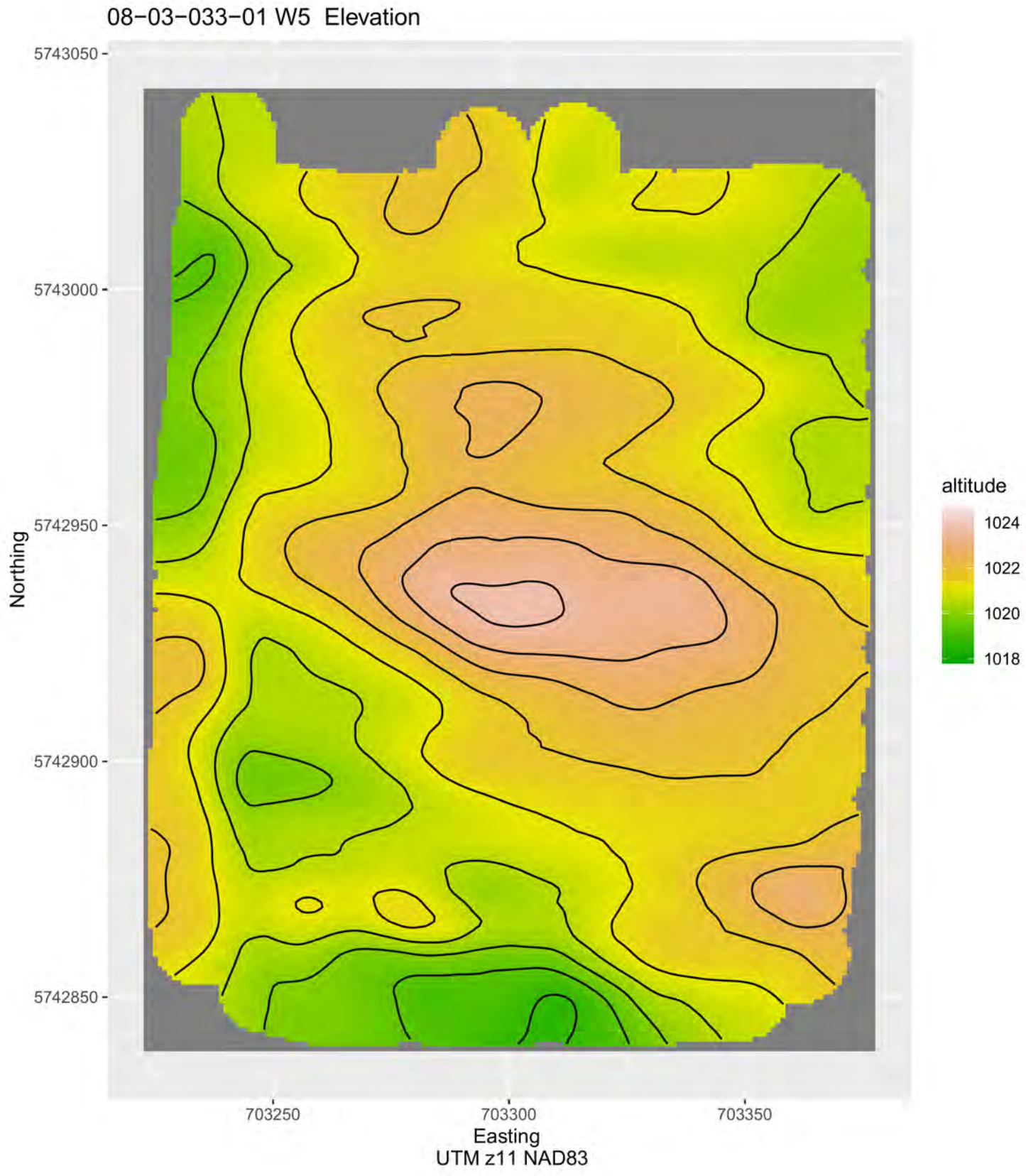
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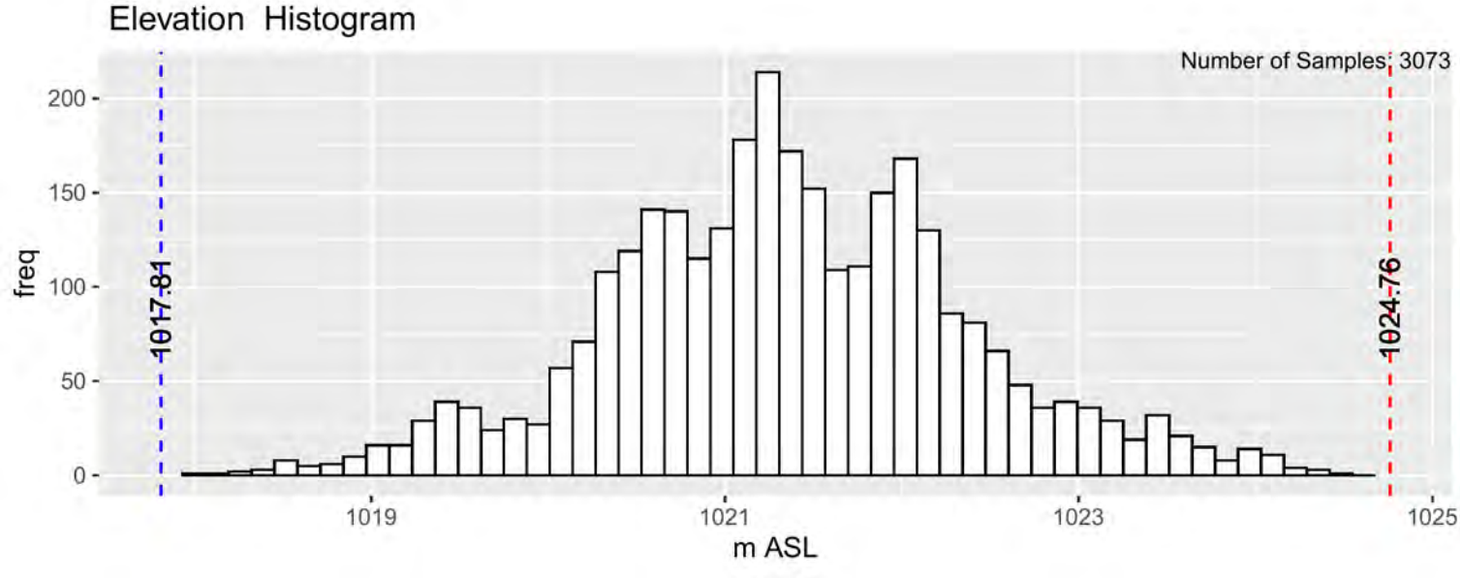
Geophysical Survey - LSD 8

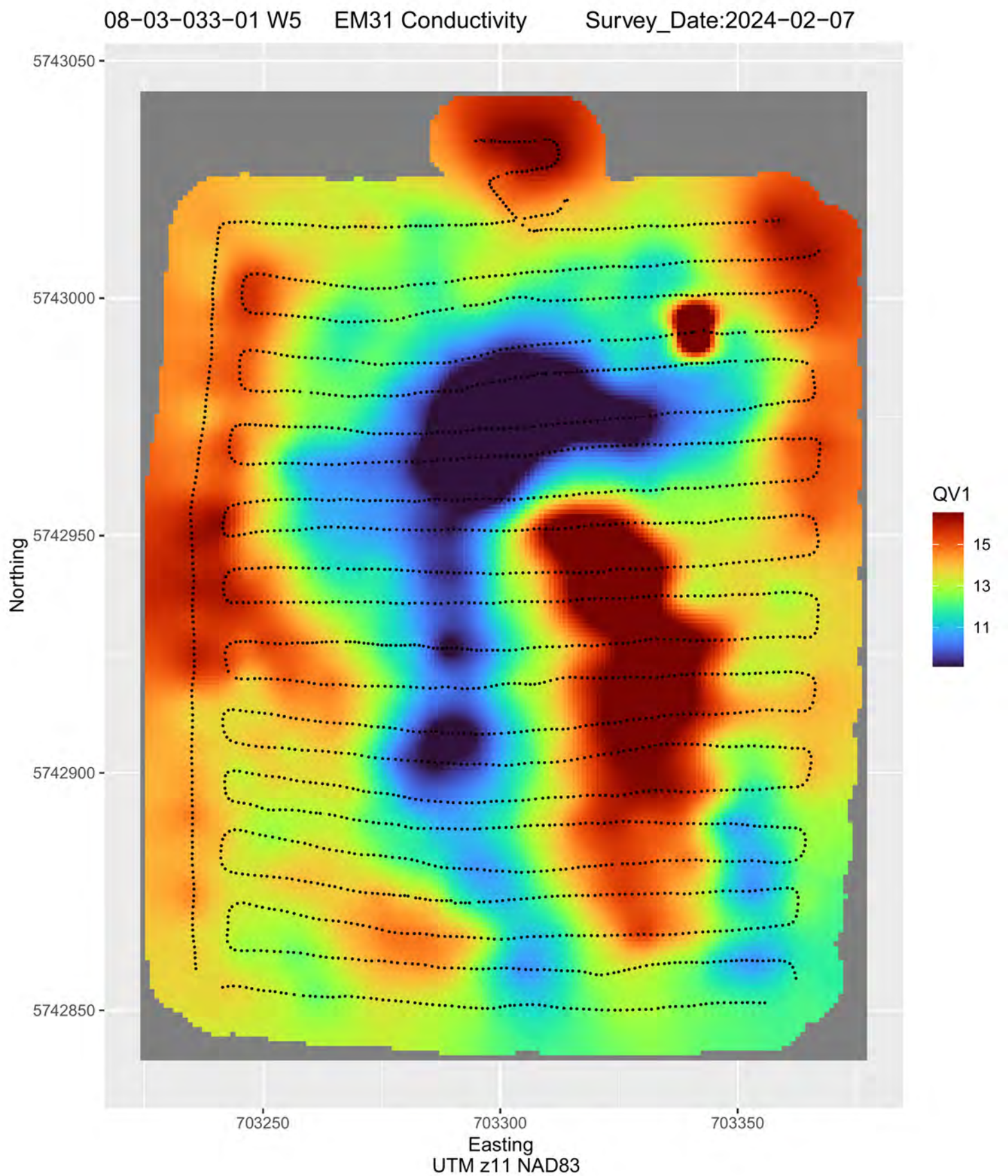


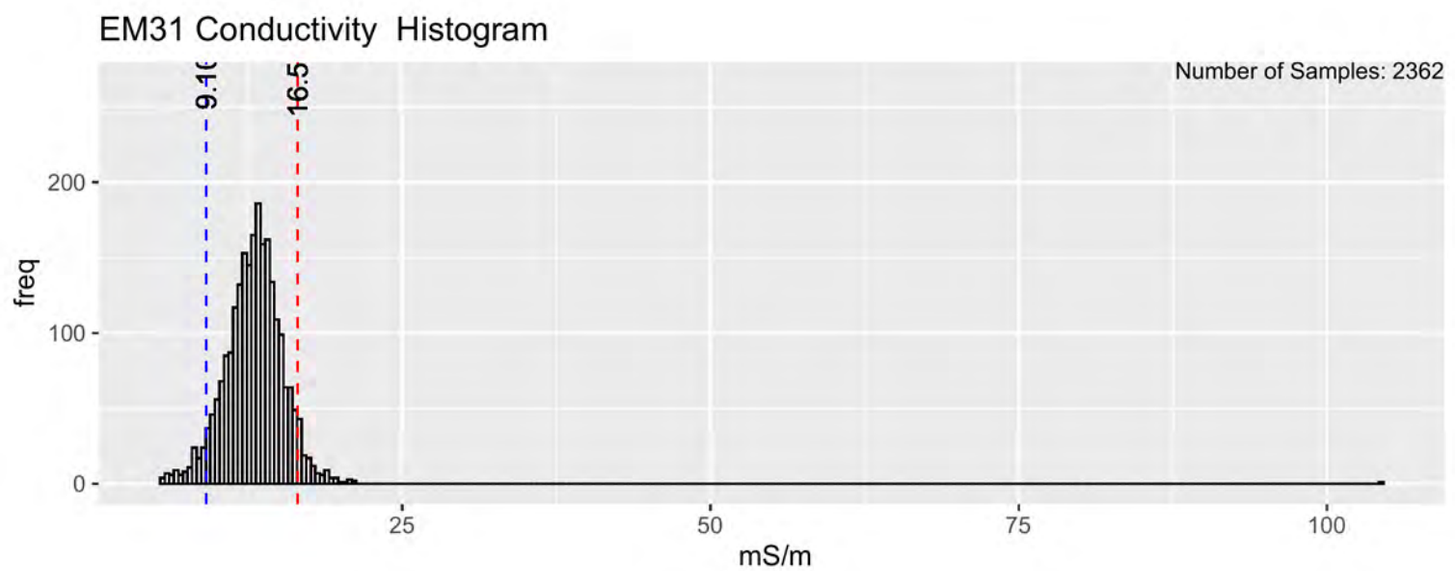
Bifröst

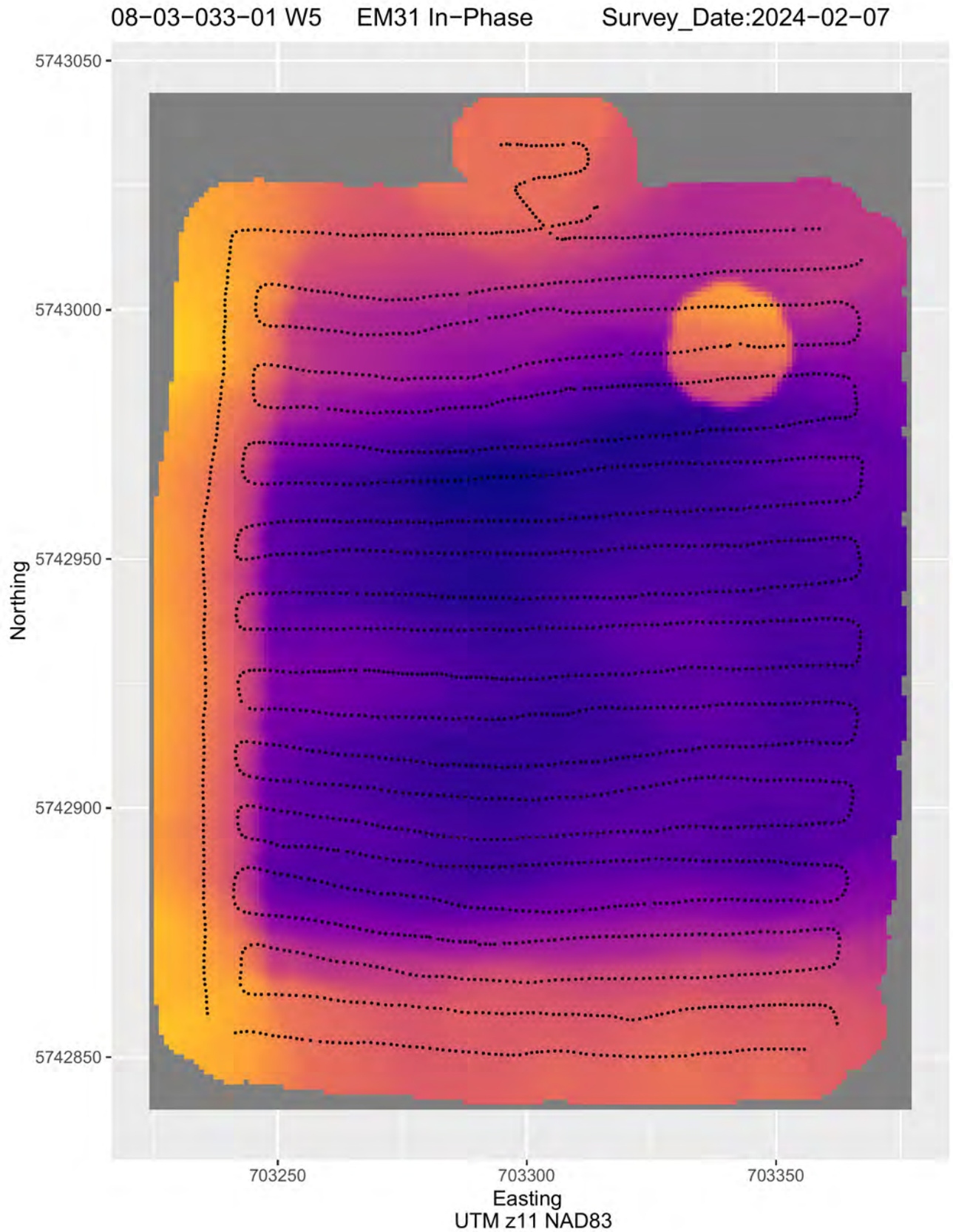
Environmental and Remediation Services Inc.

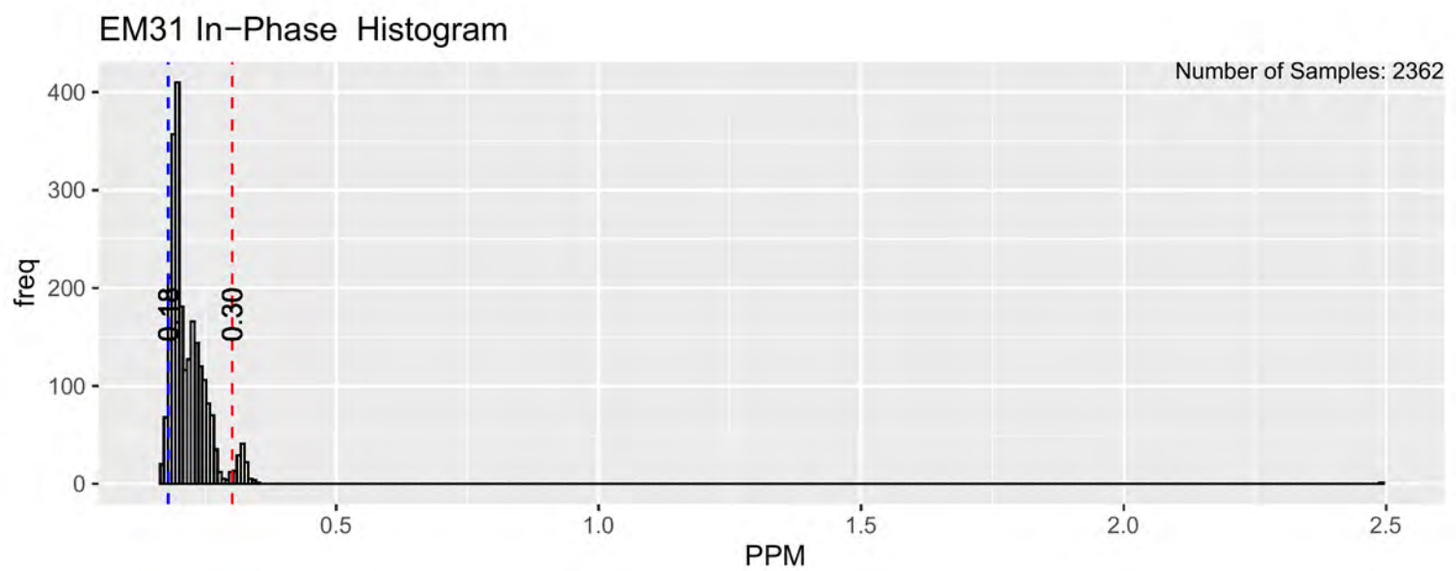

08-03-033-01 W5 Elevation
5743050
5743000
5742950
5742900
5742850
Northing
703250
703300
703350
Easting
UTM z11 NAD83
altitude
1024
1022
1020
1018

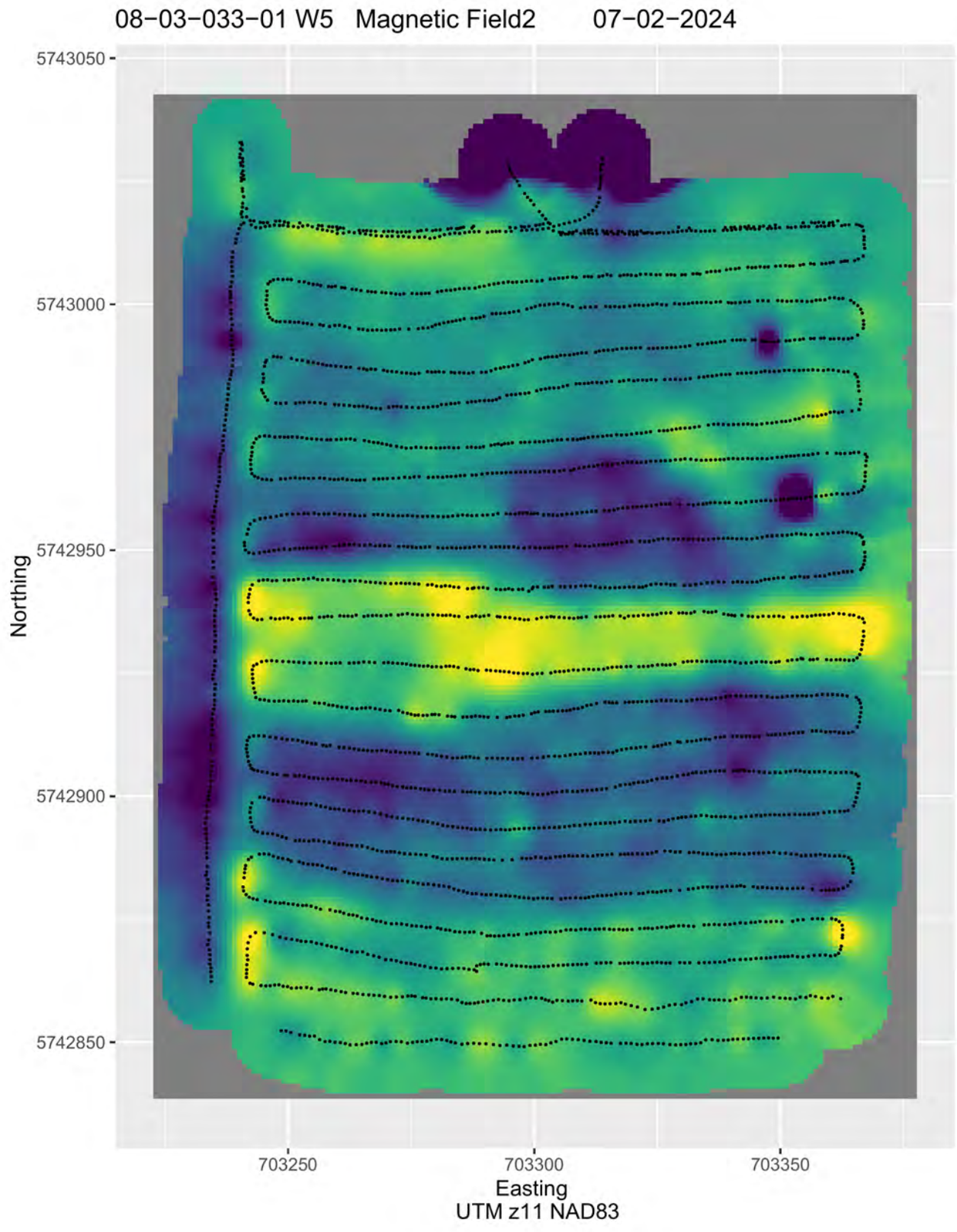

Elevation Histogram
Number of Samples: 3073
200
150
100
50
0
freq
1017.81
1024.76
1019
1021
1023
1025
m ASL

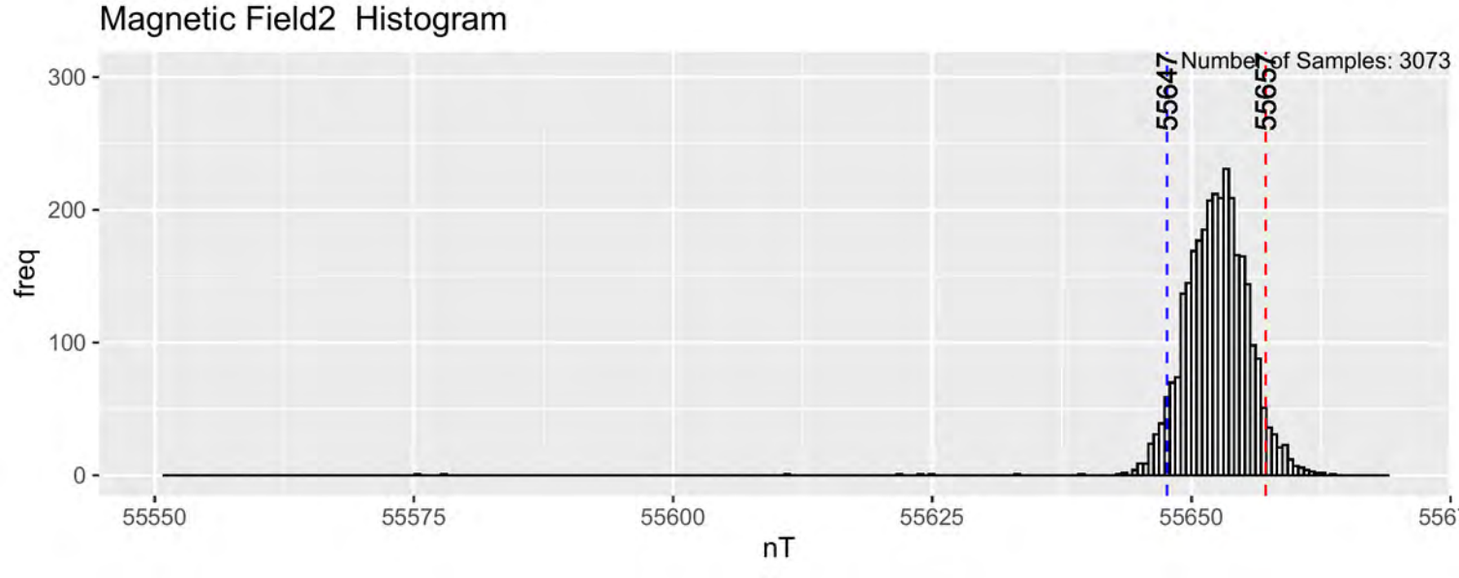

08-03-033-01 W5 EM31 Conductivity Survey_Date:2024-02-07
5743050
5743000
5742950
5742900
5742850
Northing
703250
703300
703350
Easting
UTM z11 NAD83
QV1
15
13
11


EM31 Conductivity Histogram
Number of Samples: 2362
9.1
16.5
200
100
0
freq
25
50
75
100
mS/m


08-03-033-01 W5 EM31 In-Phase Survey_Date:2024-02-07
5743050
5743000
5742950
5742900
5742850
Northing
703250
703300
703350
Easting
UTM z11 NAD83
IV1
0.30
0.27
0.24
0.21
0.18


EM31 In-Phase Histogram
Number of Samples: 2362
400
300
200
100
0
freq
0.18
0.30
0.5
1.0
1.5
2.0
2.5
PPM


08-03-033-01 W5 Magnetic Field2 07-02-2024
5743050
5743000
5742950
5742900
5742850
Northing
703250
703300
703350
Easting
UTM z11 NAD83
Field2
55655.0
55652.5
55650.0


Magnetic Field2 Histogram
Number of Samples: 3073
55647
55657
300
200
100
0
freq
55550
55575
55600
55625
55650
nT

APPENDIX W

Methane Surveys

Bifröst

Environmental and Remediation Services Inc.

APPENDIX W1

Methane Survey - LSD 7

Bifröst

Environmental and Remediation Services Inc.

McElhanney
4728 78A Street Close Red Deer, Alberta
Phone: 403 346 7555 T4P 2J2
Email: reddeer@mcelhanney.com

Client: Peyto Exploration c/o ANTHONY TRAVERSE

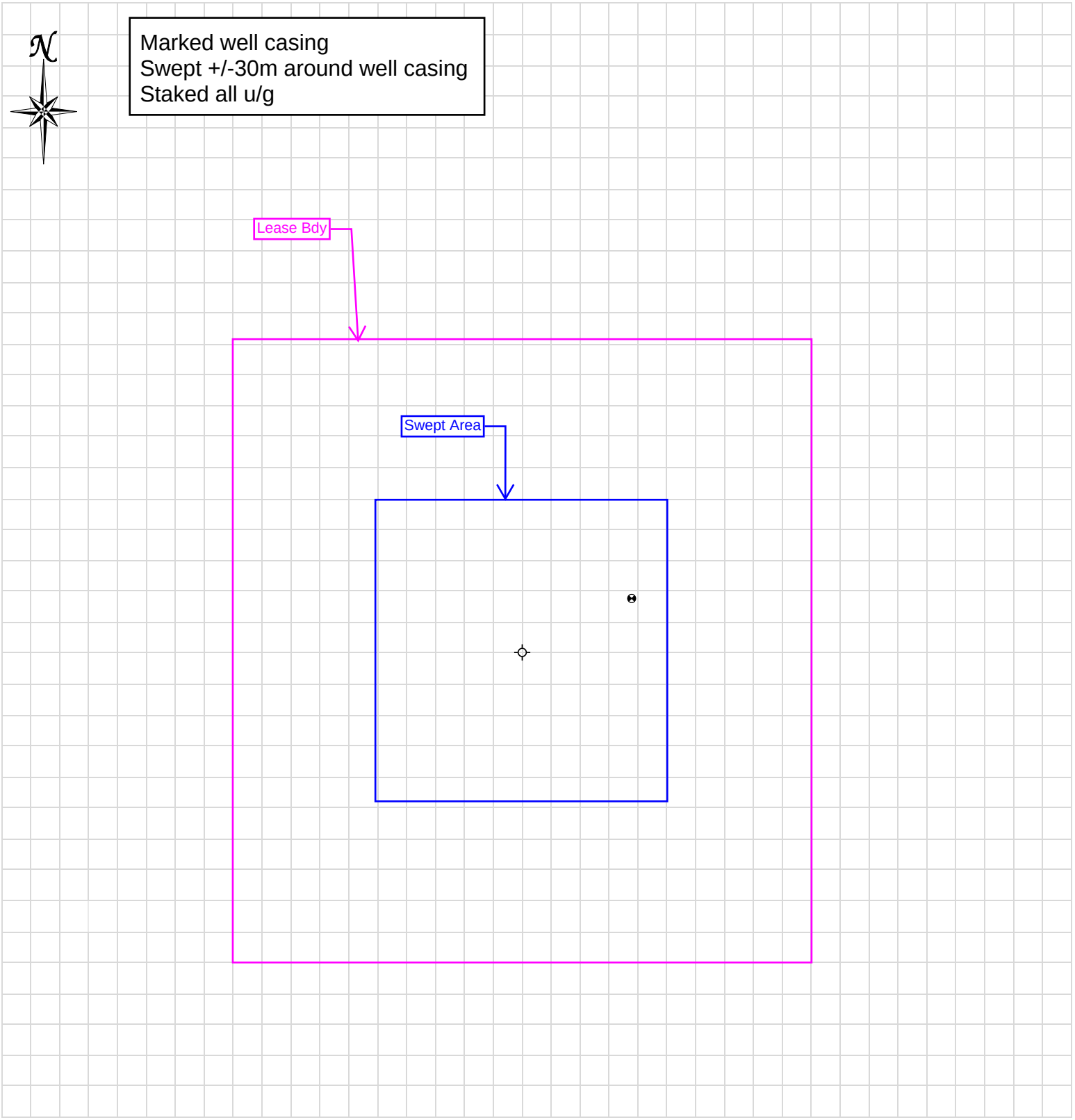
Location: 7-3-33-1w5

Job#	AOC#	Date:	Crew:	Locating Equipment Make/Serial #
254286		Mar 12, 2024	JR/BG	Fuji 960 000931

Facility Location Checklist	Yes	No
Daily Function Test	✔	
Grid Sweep(s)	✔	
Circle Sweep(s)	✔	
Parallel Line Check(s)	✔	
Swept Area(s) Shown	✔	
Discrepancies (Info/Locate)	✔	
Discrepancies Noted	✔	

SKETCH NOT TO SCALE

This drawing references buried utilities and anomalies located to the best of the locator's abilities during the site visit and is valid for two (2) weeks after the date of the locate. Due to limitations of the electronic locating equipment, ground conditions and pipe material, McElhanney Ltd cannot guarantee the depth, size, material, or substance of buried utilities and anomalies. The location of all buried utilities and anomalies must be considered approximate, and some buried utilities and anomalies may not have been located. There may be buried utilities and anomalies within five (5) meters of above ground infrastructure that could not be located due to bleed off and/or interference within five (5) meters of other buried infrastructure that could not be located. Underground segments of pipe and cable may not be located. Markings delineating buried utilities and anomalies are not representative of the true size of the utility. Single cables and pipes shown on the sketch may include multiple buried utilities and anomalies in a common trench. All pipelines have been identified by AER licence and line number to the best of the locator's ability with the available information. Additional procedures and locating may be required if buried utilities and anomalies need to be identified with 100% certainty. Prior to any mechanical excavation within five (5) meters from markings, expose the locations of all existing buried utilities and anomalies by hand digging or hydro-vac. McElhanney Ltd is not liable for any untraceable, unlocatable, or unregistered buried utilities and anomalies that have not been marked in the field or shown on the locate sketch or for any ground disturbance conducted outside of the scanned boundary. If the work area described or outlined on this drawing is not correct or if there is any change to the work area or scope, additional locating is required prior to ground disturbance. If field markings are removed or are destroyed, a new locate is required. This drawing is the property of McElhanney Ltd and shall not be used, reused, or reproduced without the consent of McElhanney Ltd. This drawing has been prepared for the client identified, based on the client requirements and to meet the standards and requirements of the applicable agencies at the time of preparation. McElhanney Ltd will not be liable for any losses or other consequences resulting from the improper or unauthorized use of this drawing, or the use or reliance upon this drawing by any third party, including contractors, suppliers, consultants and stakeholders without McElhanney Ltd.'s prior written consent.



Casptone Oilfield Services Ltd.
#101, 15 Willoughby Street
Devonia Business Park
Blackfoot, AB. T0B 0L0
Office: 780-875-5522
Fax: 780-875-5533
Web: www.capstoneos.com

D079 Project Report

Unique Well Identifier	Well Name	Surface Location	License #	Date
00/07-03-033-01W5/0	ALBERTA856 GARR 7-3-33-1	07-03-033-01W5	0072245	05/15/2024

Dir. 079 Gas Migration Test Prepared For: Peyto Exploration & Development Corp.

- The subject property inspection was conducted and completed by trained and competent personnel employed by Capstone Oilfield Services - Well Integrity Division.
- GM testing performed according to AER Directive 079 guidance, and Capstone Dir. 079 testing protocols.
- Gas Migration (GM) test results are displayed in "ppm" unless otherwise noted. - All methane testing conducted using I.R. LMD unit serial #3381122.

- Magnetic Locator - Make: Schonstedt-HeliFlux Model GA-72Cd / Serial #268308

- Detection threshold: 1 ppm sensitivity, sampling intervals - continuous.

- Measurement scales: 0-10,000 ppm or 0 ppm to 100 % gas volume.
- Response time: T90 standard: 4.5 seconds.
- Calibration Span: 01/01/2024 - 01/01/2026 (+/- 10%) CH4.

- GM testing commenced at 11:00 and concluded at 12:30.
- Atmosphere methane concentrations of 2 ppm were noted prior to commencement of Gas Migration testing.
- Control test points used as a background soil methane reference were selected and are noted as, #BG1, #BG2, #BG3.
- Background soil methane was established to be: 2 ppm. See attached test point map.
- Cut/capped well is located across Olds Golf Club.
- Well center determined by GPS coordinates from historical data in Abadata.

Unique Well Identifier	Well Name	Surface Location	License #	Date
00/07-03-033-01W5/0	ALBERTA856 GARR 7-3-33-1	07-03-033-01W5	0072245	05/15/2024

- Vegetation appears normal and healthy for seasonal growth.

- Nearest permanent structure is the golf cart garage located 306m away from the located well center. (see attached map)

- Gas migration testing was conducted in a 6m radius around the located well center. (See attached Capstone Well Integrity report, and gas migration test point grid)

- No elevated methane concentrations above background values were detected.

- Gas migration appears to be absent at the subject well.

Tested By Lawrence Ridsdale

00/07-03-033-01W5/0



Date: May 11, 2024 Nearest permanent structure from well centre: 306m north

Well Centre: 51.800064, -114.055921

Background 1 (BG1): 30.0 meters West of Well Centre. (51.800063, -114.056361) 5ppm methane

Background 2 (BG2): 30.0 meters South of Well Centre. (51.799791, -114.055924) 3ppm methane

Background 3 (BG3): 30.0 meters East of Well Centre. (51.800043, -114.055475) 2ppm methane

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CAPSTONE JOB REPORT

Peyto Exploration & Development Corp.	271765
Prepared For	*Job Number*

Anthony Traverse		ATraverse@peyto.com
Contact	*Phone number*	*Email*

00/07-03-033-01W5/0	PEYTO OIL & GAS CORP.	0072245	2024-05-15
Unique Well Identifier	*Well Licensee*	*License #*	*Date*



CAPSTONE

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JOB AND SITE INFORMATION

Job Information

Peyto Exploration & Development Corp.	00/07-03-033-01W5/0	0072245	2024-05-15
Prepared For	*Unique Well Identifier*	*License #*	*Date*

ALBERTA856 GARR 7-3-33-1

Well Name

Anthony Traverse		2024.05.15.LR
On Site Contact	*Phone*	*SWP*

AFE	*PO*

Lawrence Ridsdale		
DSA On Site Personnel	*Email Address*	*Phone*

Work Performed:

- Gas Migration
- Directive 079 Inspection

Job Details

Site Information

2.0 ppm 20 m South of Well Head.

Peak Background Atmoshperic Methane Measured

In agricultural (cultivated/seeded land) area	Single well site	Vertical
Well Resides In	*Single/Multi-well Site*	*Drill Type*

Foot	Clear/Dry and Firm
Accessed By	*Access Is*

Site is accessible by foot on seeded land.

Comments/Recommendations

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GAS MIGRATION INSPECTION

Peyto Exploration & Development Corp.	00/07-03-033-01W5/0	0072245	2024-05-15
Company	*Unique Well Identifier*	*License #*	*Date*

Background soil gas methane was 2.0 ppm measured 20 m South-East of well centre.	Absent
Background Soil Gas Methane	*Gas Migration Status*

No significant elevated methane levels were detected in the soils surrounding the wellbore. Gas migration is not suspected.

Gas Migration Comments

Vegetation appears healthy across site, exhibiting normal seasonal colour and growth.

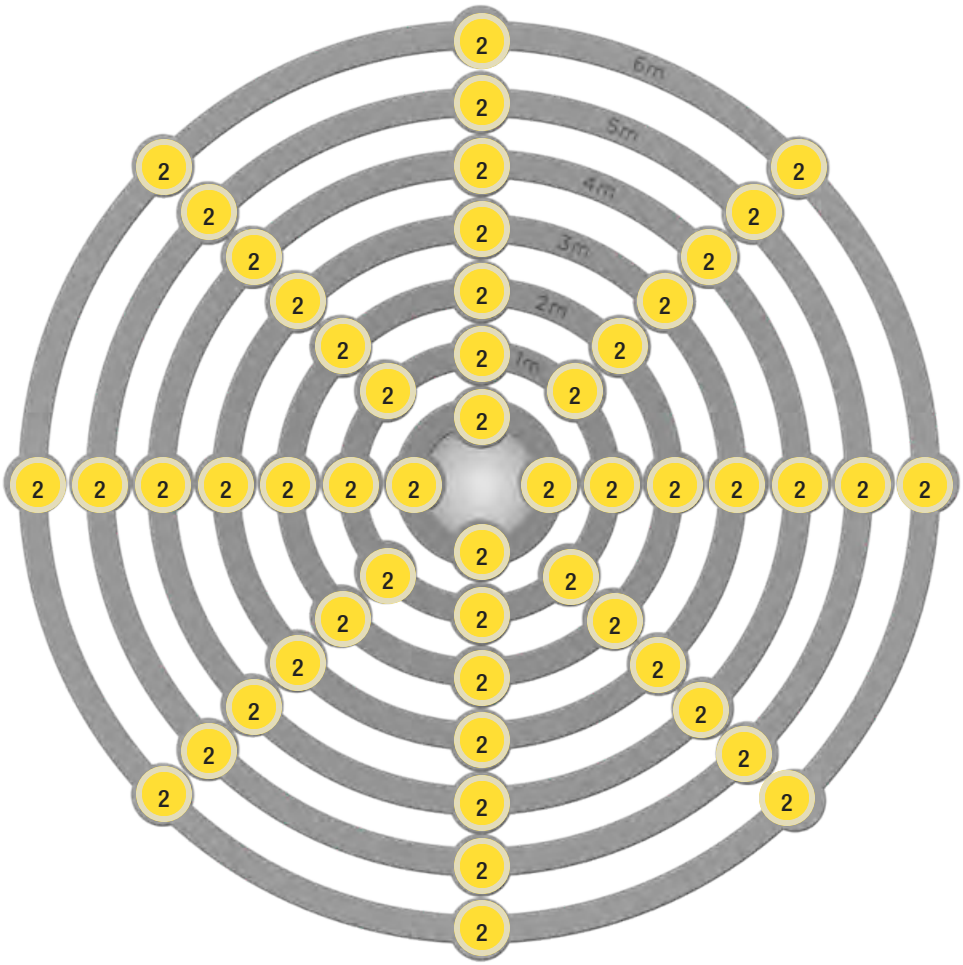
Vegetation Comments

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GAS MIGRATION INSPECTION

Surface Soil Gas Data



PEAK READING	
2	**ppm**
< 0.05	**% V**
< 1	**% LEL**

Legend			
	Water		Rigmat
	Concrete		Ice
	Pump Jack		Building
	Sample		

PPM Color Key	
10	10 or less
99	11 to 99
10.0v	100 and up

Surface soil gas data is collected using DSA's patent pending surface contact GM test method. The method is recognized and accepted by regulatory bodies where DSA operates. For more information about our procedures and/or intellectual property, contact legal@doullsite.com.

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GAS MIGRATION INSPECTION

SURFACE SOIL GAS DATA								
#	Soil Methane			Position	Direction	Obstruction		Sample
1	2 ppm	< 0.05 % V	< 1 % LEL	0 m	North			NO
2	2 ppm	< 0.05 % V	< 1 % LEL	1 m	North			NO
3	2 ppm	< 0.05 % V	< 1 % LEL	2 m	North			NO
4	2 ppm	< 0.05 % V	< 1 % LEL	3 m	North			NO
5	2 ppm	< 0.05 % V	< 1 % LEL	4 m	North			NO
6	2 ppm	< 0.05 % V	< 1 % LEL	5 m	North			NO
7	2 ppm	< 0.05 % V	< 1 % LEL	6 m	North			NO
8	2 ppm	< 0.05 % V	< 1 % LEL	1 m	North-East			NO
9	2 ppm	< 0.05 % V	< 1 % LEL	2 m	North-East			NO
10	2 ppm	< 0.05 % V	< 1 % LEL	3 m	North-East			NO
11	2 ppm	< 0.05 % V	< 1 % LEL	4 m	North-East			NO
12	2 ppm	< 0.05 % V	< 1 % LEL	5 m	North-East			NO
13	2 ppm	< 0.05 % V	< 1 % LEL	6 m	North-East			NO
14	2 ppm	< 0.05 % V	< 1 % LEL	0 m	East			NO
15	2 ppm	< 0.05 % V	< 1 % LEL	1 m	East			NO
16	2 ppm	< 0.05 % V	< 1 % LEL	2 m	East			NO
17	2 ppm	< 0.05 % V	< 1 % LEL	3 m	East			NO
18	2 ppm	< 0.05 % V	< 1 % LEL	4 m	East			NO
19	2 ppm	< 0.05 % V	< 1 % LEL	5 m	East			NO
20	2 ppm	< 0.05 % V	< 1 % LEL	6 m	East			NO
21	2 ppm	< 0.05 % V	< 1 % LEL	1 m	South-East			NO
22	2 ppm	< 0.05 % V	< 1 % LEL	2 m	South-East			NO
23	2 ppm	< 0.05 % V	< 1 % LEL	3 m	South-East			NO
24	2 ppm	< 0.05 % V	< 1 % LEL	4 m	South-East			NO
25	2 ppm	< 0.05 % V	< 1 % LEL	5 m	South-East			NO
26	2 ppm	< 0.05 % V	< 1 % LEL	6 m	South-East			NO
27	2 ppm	< 0.05 % V	< 1 % LEL	0 m	South			NO
28	2 ppm	< 0.05 % V	< 1 % LEL	1 m	South			NO

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GAS MIGRATION INSPECTION

SURFACE SOIL GAS DATA

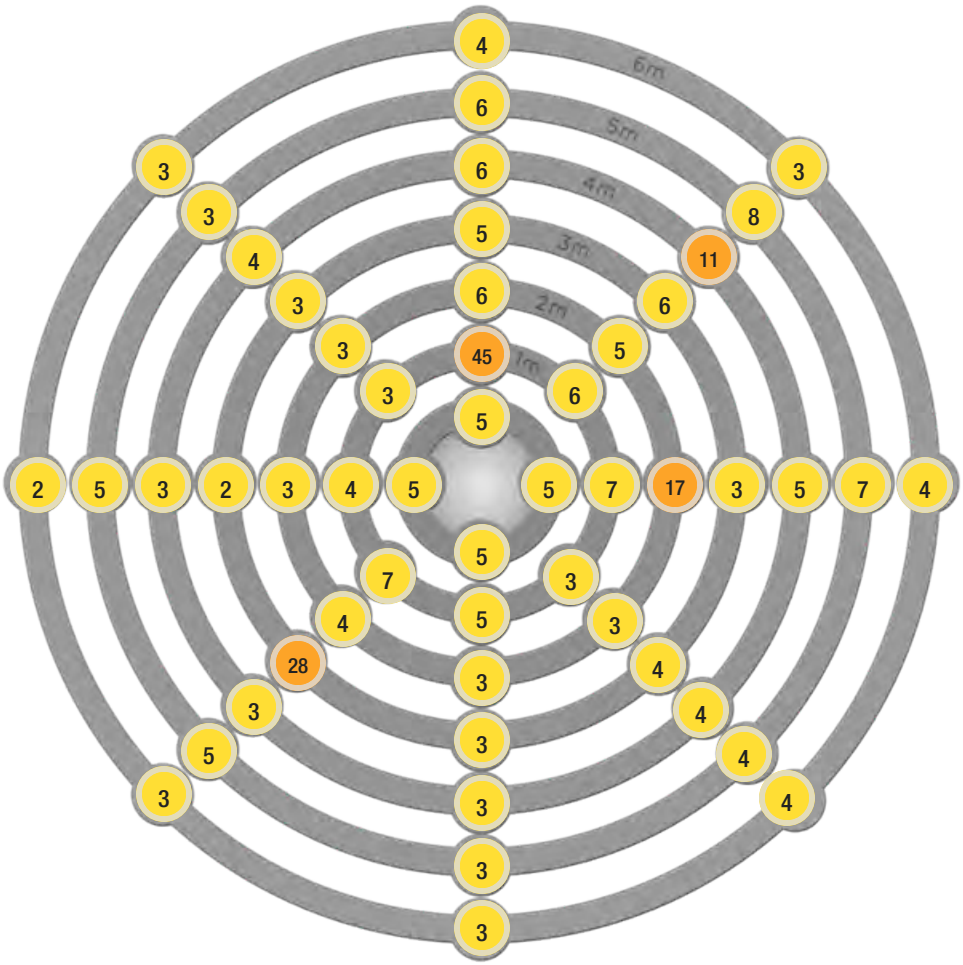
#	Soil Methane			Position	Direction	Obstruction			Sample
29	2 ppm	< 0.05 % V	< 1 % LEL	2 m	South				NO
30	2 ppm	< 0.05 % V	< 1 % LEL	3 m	South				NO
31	2 ppm	< 0.05 % V	< 1 % LEL	4 m	South				NO
32	2 ppm	< 0.05 % V	< 1 % LEL	5 m	South				NO
33	2 ppm	< 0.05 % V	< 1 % LEL	6 m	South				NO
34	2 ppm	< 0.05 % V	< 1 % LEL	1 m	South-West				NO
35	2 ppm	< 0.05 % V	< 1 % LEL	2 m	South-West				NO
36	2 ppm	< 0.05 % V	< 1 % LEL	3 m	South-West				NO
37	2 ppm	< 0.05 % V	< 1 % LEL	4 m	South-West				NO
38	2 ppm	< 0.05 % V	< 1 % LEL	5 m	South-West				NO
39	2 ppm	< 0.05 % V	< 1 % LEL	6 m	South-West				NO
40	2 ppm	< 0.05 % V	< 1 % LEL	0 m	West				NO
41	2 ppm	< 0.05 % V	< 1 % LEL	1 m	West				NO
42	2 ppm	< 0.05 % V	< 1 % LEL	2 m	West				NO
43	2 ppm	< 0.05 % V	< 1 % LEL	3 m	West				NO
44	2 ppm	< 0.05 % V	< 1 % LEL	4 m	West				NO
45	2 ppm	< 0.05 % V	< 1 % LEL	5 m	West				NO
46	2 ppm	< 0.05 % V	< 1 % LEL	6 m	West				NO
47	2 ppm	< 0.05 % V	< 1 % LEL	1 m	North-West				NO
48	2 ppm	< 0.05 % V	< 1 % LEL	2 m	North-West				NO
49	2 ppm	< 0.05 % V	< 1 % LEL	3 m	North-West				NO
50	2 ppm	< 0.05 % V	< 1 % LEL	4 m	North-West				NO
51	2 ppm	< 0.05 % V	< 1 % LEL	5 m	North-West				NO
52	2 ppm	< 0.05 % V	< 1 % LEL	6 m	North-West				NO

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GAS MIGRATION INSPECTION

Subsurface Soil Gas Data



PEAK READING	
45	**ppm**
< 0.05	**% V**
< 1	**% LEL**

Legend			
	Water		Rigmat
	Concrete		Ice
	Pump Jack		Building
	Sample		

PPM Color Key	
10	10 or less
99	11 to 99
10.0v	100 and up

Subsurface soil gas data is collected by DSA's subsurface GM test method. The method is recognized and accepted by regulatory bodies where DSA operates. For more information about our procedures and/or intellectual property, contact legal@doullsite.com.

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GAS MIGRATION INSPECTION

SUBSURFACE SOIL GAS DATA

#	Soil Methane			Position	Direction	Obstruction		Sample
1	5 ppm	< 0.05 % V	< 1 % LEL	0 m	North			NO
2	45 ppm	< 0.05 % V	< 1 % LEL	1 m	North			NO
3	6 ppm	< 0.05 % V	< 1 % LEL	2 m	North			NO
4	5 ppm	< 0.05 % V	< 1 % LEL	3 m	North			NO
5	6 ppm	< 0.05 % V	< 1 % LEL	4 m	North			NO
6	6 ppm	< 0.05 % V	< 1 % LEL	5 m	North			NO
7	4 ppm	< 0.05 % V	< 1 % LEL	6 m	North			NO
8	6 ppm	< 0.05 % V	< 1 % LEL	1 m	North-East			NO
9	5 ppm	< 0.05 % V	< 1 % LEL	2 m	North-East			NO
10	6 ppm	< 0.05 % V	< 1 % LEL	3 m	North-East			NO
11	11 ppm	< 0.05 % V	< 1 % LEL	4 m	North-East			NO
12	8 ppm	< 0.05 % V	< 1 % LEL	5 m	North-East			NO
13	3 ppm	< 0.05 % V	< 1 % LEL	6 m	North-East			NO
14	5 ppm	< 0.05 % V	< 1 % LEL	0 m	East			NO
15	7 ppm	< 0.05 % V	< 1 % LEL	1 m	East			NO
16	17 ppm	< 0.05 % V	< 1 % LEL	2 m	East			NO
17	3 ppm	< 0.05 % V	< 1 % LEL	3 m	East			NO
18	5 ppm	< 0.05 % V	< 1 % LEL	4 m	East			NO
19	7 ppm	< 0.05 % V	< 1 % LEL	5 m	East			NO
20	4 ppm	< 0.05 % V	< 1 % LEL	6 m	East			NO
21	3 ppm	< 0.05 % V	< 1 % LEL	1 m	South-East			NO
22	3 ppm	< 0.05 % V	< 1 % LEL	2 m	South-East			NO
23	4 ppm	< 0.05 % V	< 1 % LEL	3 m	South-East			NO
24	4 ppm	< 0.05 % V	< 1 % LEL	4 m	South-East			NO
25	4 ppm	< 0.05 % V	< 1 % LEL	5 m	South-East			NO
26	4 ppm	< 0.05 % V	< 1 % LEL	6 m	South-East			NO
27	5 ppm	< 0.05 % V	< 1 % LEL	0 m	South			NO
28	5 ppm	< 0.05 % V	< 1 % LEL	1 m	South			NO

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GAS MIGRATION INSPECTION

SUBSURFACE SOIL GAS DATA

#	Soil Methane			Position	Direction	Obstruction		Sample
29	3 ppm	< 0.05 % V	< 1 % LEL	2 m	South			NO
30	3 ppm	< 0.05 % V	< 1 % LEL	3 m	South			NO
31	3 ppm	< 0.05 % V	< 1 % LEL	4 m	South			NO
32	3 ppm	< 0.05 % V	< 1 % LEL	5 m	South			NO
33	3 ppm	< 0.05 % V	< 1 % LEL	6 m	South			NO
34	7 ppm	< 0.05 % V	< 1 % LEL	1 m	South-West			NO
35	4 ppm	< 0.05 % V	< 1 % LEL	2 m	South-West			NO
36	28 ppm	< 0.05 % V	< 1 % LEL	3 m	South-West			NO
37	3 ppm	< 0.05 % V	< 1 % LEL	4 m	South-West			NO
38	5 ppm	< 0.05 % V	< 1 % LEL	5 m	South-West			NO
39	3 ppm	< 0.05 % V	< 1 % LEL	6 m	South-West			NO
40	5 ppm	< 0.05 % V	< 1 % LEL	0 m	West			NO
41	4 ppm	< 0.05 % V	< 1 % LEL	1 m	West			NO
42	3 ppm	< 0.05 % V	< 1 % LEL	2 m	West			NO
43	2 ppm	< 0.05 % V	< 1 % LEL	3 m	West			NO
44	3 ppm	< 0.05 % V	< 1 % LEL	4 m	West			NO
45	5 ppm	< 0.05 % V	< 1 % LEL	5 m	West			NO
46	2 ppm	< 0.05 % V	< 1 % LEL	6 m	West			NO
47	3 ppm	< 0.05 % V	< 1 % LEL	1 m	North-West			NO
48	3 ppm	< 0.05 % V	< 1 % LEL	2 m	North-West			NO
49	3 ppm	< 0.05 % V	< 1 % LEL	3 m	North-West			NO
50	4 ppm	< 0.05 % V	< 1 % LEL	4 m	North-West			NO
51	3 ppm	< 0.05 % V	< 1 % LEL	5 m	North-West			NO
52	3 ppm	< 0.05 % V	< 1 % LEL	6 m	North-West			NO

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INSPECTION PHOTOS AND WELL INFO

Peyto Exploration & Development Corp.	00/07-03-033-01W5/0	0072245	2024-05-15
Prepared For	*Unique Well Identifier*	*License #*	*Date*

Well Information

1978-12-29	1979-01-05	ABD	07-03-033-01W5	N 51.799975, W 114.055749
Final drill date	*Abandoned date*	*Status*	*Surface Location*	*Surface coordinates - WGS 84 Decimal Degrees*

Comments/Recommendations

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INSPECTION PHOTOS AND WELL INFO



Comment



Comment



Background sample 2 (30m, 3ppm, south)

Comment



Background reading 3 (30m, east, 2 ppm)

Comment

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E-mail: support@doullsite.com
Office: 780-875-5522
Web: www.doullsite.com
Fax: 780-875-5533

INSPECTION PHOTOS AND WELL INFO



Background sample 1 (30m ,5ppm, west)

Comment



Facing east

Comment



Facing north

Comment



Facing west

Comment

CAPSTONE

Toll Free: 1-855–500-VENT
E-mail: support@doullsite.com
Office: 780-875-5522
Web: www.doullsite.com
Fax: 780-875-5533

INSPECTION PHOTOS AND WELL INFO



Facing south

Comment



Comment



Pipe to east

Comment

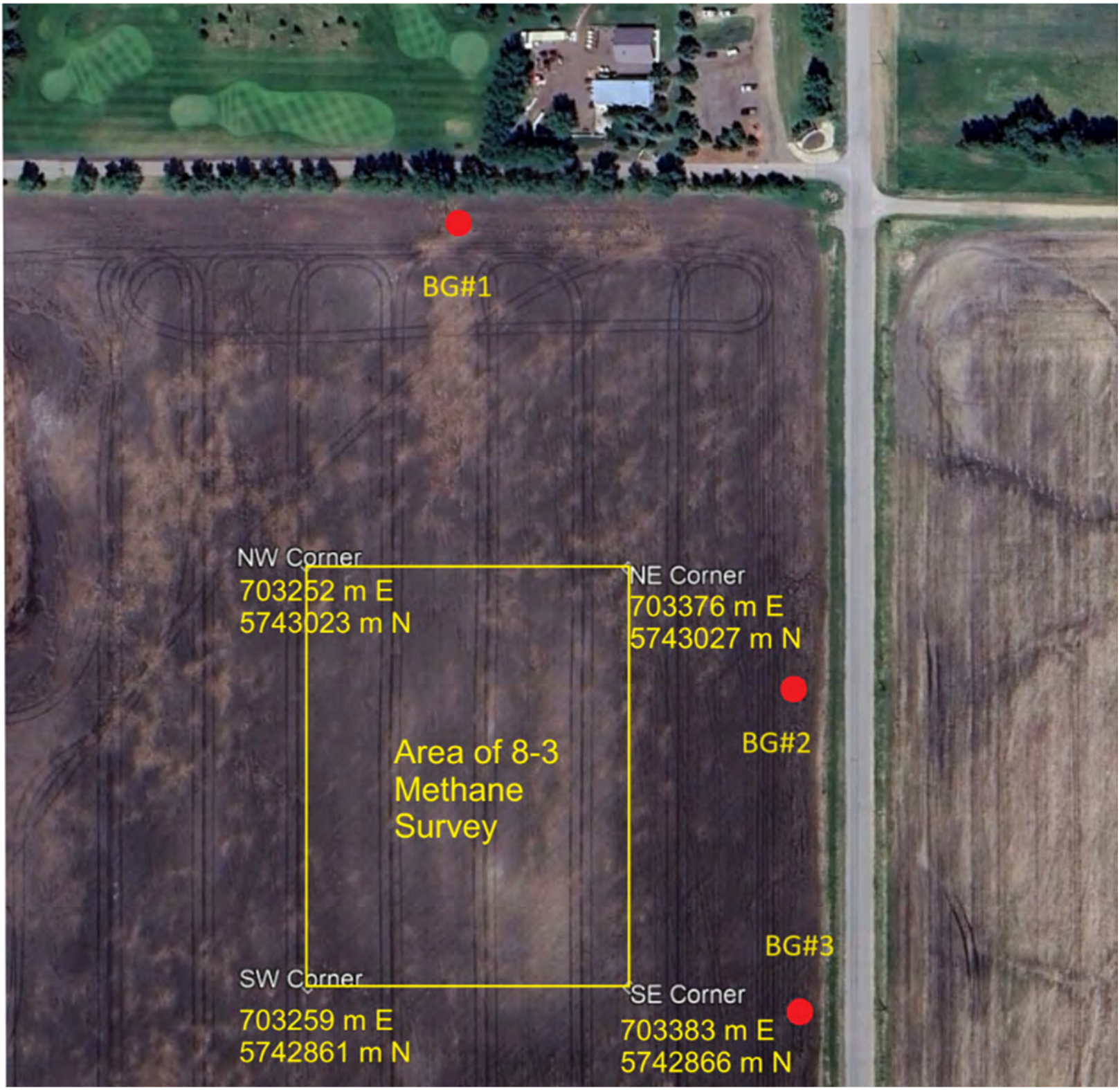
APPENDIX W2

Methane Survey - LSD 8

Bifröst

Environmental and Remediation Services Inc.

00/08-03-033-01W5/0



Date: May 11, 2024 Nearest permanent structure from center point: ~310m north

Centre: 51.800064, -114.055921

Background 1 (BG1): (51.802283, -114.051224) 2ppm methane

Background 2 (BG2): (51.800653, -114.049236) 2ppm methane

Background 3 (BG3): (51.799539, -114.049225) 2ppm methane

Capstone Oilfield Services Ltd.
Office: 780-875-5522
Web: www.capstoneos.com

D079 Project Report

Unique Well Identifier	Well Name	Surface Location	License #	Date
		08-03-033-01W5		05/14/2024

Dir. 079 Gas Migration Test Prepared For: BiFrost inc.

- The subject property inspection was conducted and completed by trained and competent personnel employed by Capstone Oilfield Services - Well Integrity Division.
- GM testing performed according to AER Directive 079 guidance, and Capstone Dir. 079 testing protocols.
- Gas Migration (GM) test results are displayed in "ppm" unless otherwise noted. - All methane testing conducted using I.R. LMD unit serial #3381122.

- Magnetic Locator - Make: Schonstedt-HeliFlux Model GA-72Cd / Serial #268308

- Detection threshold: 1 ppm sensitivity, sampling intervals - continuous.
- Measurement scales: 0-10,000 ppm or 0 ppm to 100 % gas volume.
- Response time: T90 standard: 4.5 seconds.
- Calibration Span: 01/01/2024 - 01/01/2026 (+/- 10%) CH4.

- GM testing commenced at 8:00 and concluded at 17:30.
- Atmosphere methane concentrations of 2 ppm were noted prior to commencement of Gas Migration testing.

- Control test points used as a background soil methane reference were selected and are noted as, #BG1, #BG2, #BG3.
- Background soil methane was established to be: 2 ppm. See attached test point map.
- Designated test area is located on cultivated agricultural field near the Olds Golf Club.
- Test area was chosen by starting at center point of test area in picture provided.
- As per client request site was accessed by foot.

Unique Well Identifier	Well Name	Surface Location	License #	Date
		08-03-033-01W5		

- Field was recently tilled and seeded so there is a lack of vegetation to be assessed.

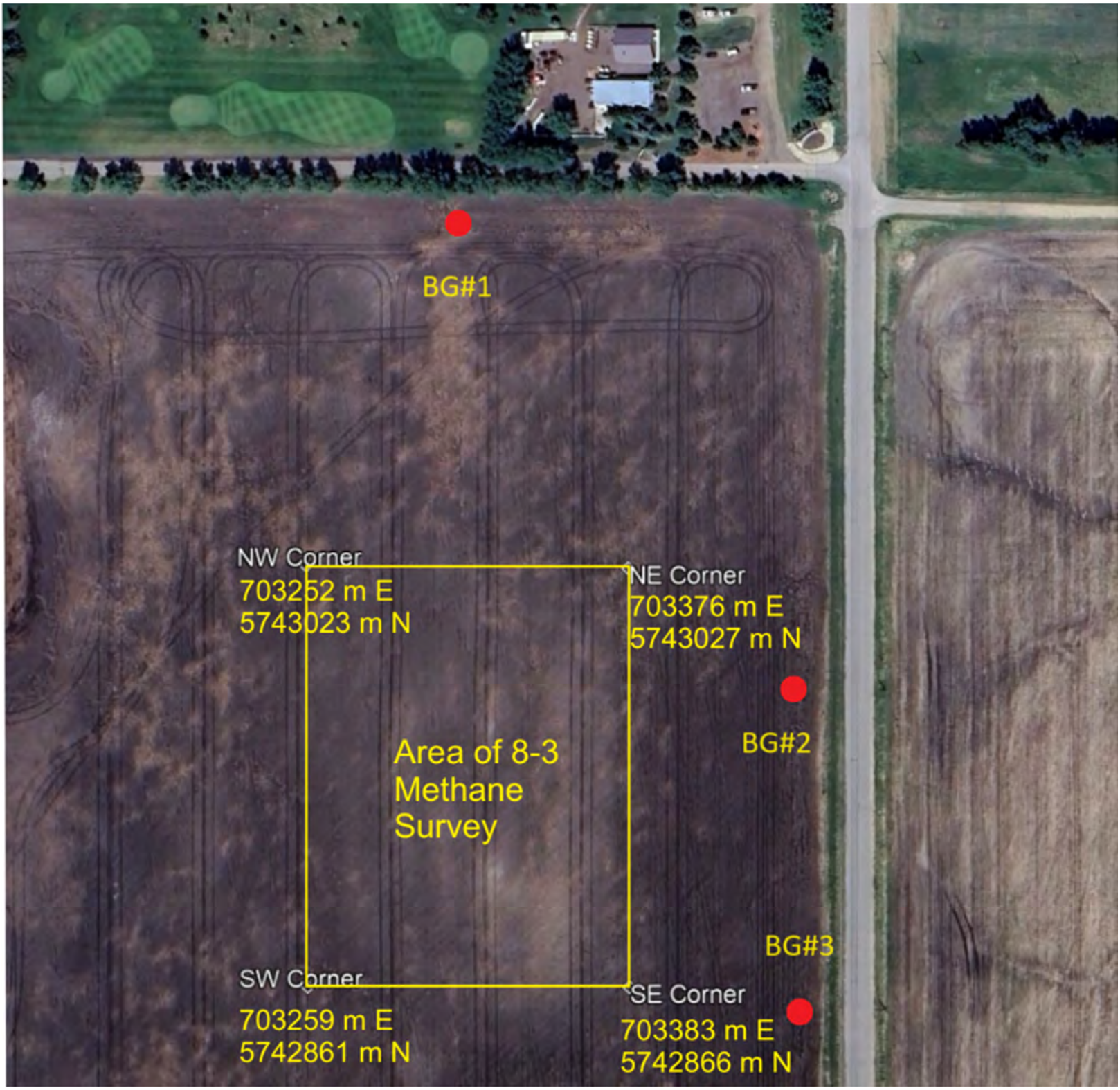
- Nearest permanent structure is the golf shed located 310m away from the located test areas center point. (see attached map)

- Gas migration testing was conducted in a 60mx60m grid around the determined center point. (See attached)

- Very slightly elevated methane levels ranging from 2ppm (Atmospheric Levels) to 120 ppm were measured throughout the 60mx60m test grid. There is no historical information of any oil or gas wells actually being drilled on this lot of land, but these levels could be due to a very slight gas migration issue occurring if said wells were in fact drilled. These levels could also be due to the decomposing organic material that was left on the soil from the previous years harvest has now been mixed into the soil then combined with the high amount of moisture and rain has created the necessary conditions to continue decomposition of the organic materials causing trace methane readings in the soil.

Tested By Lawrence Ridsdale

00/08-03-033-01W5/0



Date: May 11, 2024 Nearest permanent structure from center point: ~310m north

Centre: 51.800064, -114.055921

Background 1 (BG1): (51.802283, -114.051224) 2ppm methane

Background 2 (BG2): (51.800653, -114.049236) 2ppm methane

Background 3 (BG3): (51.799539, -114.049225) 2ppm methane



Facing west

Comment



Facing east

Comment



Facing south

Comment



Gps centre

Comment



Comment



Comment



Comment



Comment



Comment



Facing north

Comment

60m Subsurface Gas Migration Test

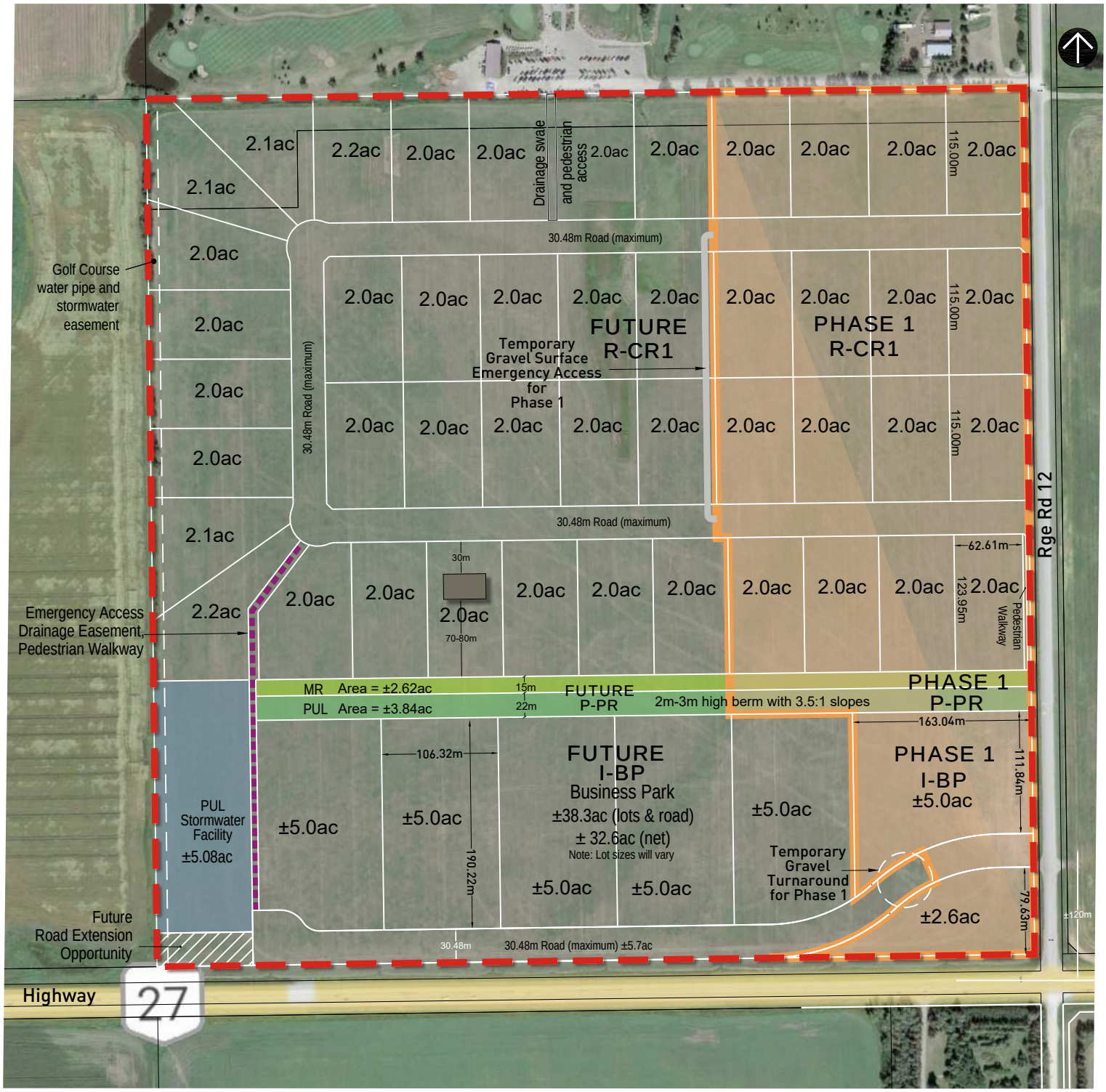
	30m W	29m W	28m W	27m W	26m W	25m W	24m W	23m W	22m W	21m W	20m W	19m W	18m W	17m W	16m W	15m W	14m W	13m W	12m W	11m W	10m W	9m W	8m W	7m W	6m W	5m W	4m W	3m W	2m W	1m W	1m E	2m E	3m E	4m E	5m E	6m E	7m E	8m E	9m E	10m E	11m E	12m E	13m E	14m E	15m E	16m E	17m E	18m E	19m E	20m E	21m E	22m E	23m E	24m E	25m E	26m E	27m E	28m E	29m E	30m E
30m N		35		46		81		5		5		5		<BDL		<BDL		<BDL		3		4		<BDL		5		6		6		<BDL		<BDL	

APPENDIX X

Concept Plan

Bifröst

Environmental and Remediation Services Inc.



Aug 13, 2024 - 11:44am W:\2023-322_Greg Brown_Netook North_CE\5.0 Technical\5.1 Technical Production\5.1.1 AutoCAD\2023-322 Concept SE3 2024July30.dwg

Legend

- Concept Plan Area ±63.09ha (±156.02ac)
- Phase 1 Land Use Redesignation and Subdivision ±19.36ha (±47.85ac)

Netook North

1273927 Alberta Ltd.

Concept Plan

SE 3-33-1 W5M

August 2024

APPENDIX Y

Assessor Qualifications

Bifröst

Environmental and Remediation Services Inc.

Bifröst
Environmental and Remediation Services Inc.

Resume of Mark A. Lehar, P.Geo. (AB, BC, SK), LPG (IN)

Employment

Bifröst Environmental and Remediation Services, Inc. (Bifröst), Calgary, Alberta 2016 – Present
General Manager
Clifton Associates Ltd, Calgary, Alberta, Canada April 2012 – March 2016
Manager, Environmental Services/Regional Technical Lead
Clifton Associates Ltd, Calgary, Alberta, Canada 2011 – April 2012
Senior Project Manager
O'Connor Associates Environmental, Inc., Calgary, Alberta, Canada 2009 – 2011
Senior Project Manager/Geologist
Professional Service Industries, Inc (PSI), Columbus, Ohio, 2005 - 2009
Manager, Environmental Services
Millennium Environmental and Remediation Services, Inc (Millennium E/RS), Galloway, Ohio 1995 - 2004
Owner and President
R&R International, Inc. (R&R), Columbus, Ohio, 1993 - 1995
Manager, Environmental Services
ERM Midwest, Inc., Worthington, Ohio, 1992 - 1993
Project Geologist
Ohio Environmental Protection Agency (Ohio EPA), Dayton, Ohio, 1990 - 1992
Project Manager
Ohio Air National Guard (OhioANG), Springfield, Ohio, 1982 – 1987
Ready Reserve, 1987 – 1996
Enlisted (1982 – 1986); Final Rank: Staff Sergeant
Officer (1986 – 1996); Final Rank: 1st Lieutenant

Education

Graduate work in Geophysics, Wright State University, Dayton, Ohio, 1988 - 1989
Bachelor of the Arts (BA), Honors in Geology, Wright State University, Dayton, Ohio, 1988
Associate's, Applied Science (AAS), Community College of the Air Force, 1986

Certifications/Registrations

EGBC Professional Geoscientist #57618, Engineers and Geoscientists of British Columbia, February 2023*
APEGS Professional Geoscientist #34549, Saskatchewan, July 2015*
APEGA Professional Geoscientist #146001, Calgary, Alberta, August 2012*
IOL Level I Supervisor, Calgary, Alberta, August 2010
Ohio Radon Tester - License #RT651, December 2008
National Environmental Health Association Radon Measurement Specialist, NRSB 8SS0071 June 2008
Ohio EPA Voluntary Action Program (VAP) Certified Professional – Number CP305, November 2006
Principal Consultant Certification, Phase II & III ESA Service Line, August 2006
Principal Consultant Appointment, Phase I ESA Service Line, January 2006
Project Management Certification, June 2005
Professional Geologist #1924, Indiana, 1998*
* Current

Professional Managerial Experience

Mr. Lehar has over 40 years of professional managerial and supervisory experience, including over 30 years of managerial experience in the environmental and remediation field, 6 years in the military, and at least 4 years with other various organizations. Throughout his career, he has demonstrated proficiency in providing environmental assessment and remediation solutions to Clients, the Public, the Regulatory community, and other Stakeholders through his understanding of technical guidance and regulations, the ability to interpret and communicate those requirements to interested parties, and through the use of multi-disciplinary teams to take effective actions on complex contaminated sites. Mr. Lehar has an innate ability to listen to Client's and other Stakeholder's needs, interpret them, and the ability to facilitate the needs of the Stakeholder with the legal requirements of the Regulator. He has shown that he has the ability to quickly grasp significant site details and then coordinate project team members, to direct the appropriate resources towards environmental and remediation program solutions using the correct operational guidelines and procedures required.

Professional Technical Experience

Mr. Lehar has over 35 years of professional environmental experience and has demonstrated technical proficiency in all manner of soil and groundwater site investigations, project management, proposals, and budgets. He has held positions where he has either directly selected appropriate remediation and risk management plans, or reviewed and approved them for use by others to ensure that all remedial objectives and regulatory requirements are met. His work has included projects working with: Alberta Environment and Parks (AEP), The City of Calgary, the City of Edmonton, Alberta Transportation (AT), Alberta Infrastructure (AI), and the Town of High River, within Canada and has included projects in the United States (US) working with the US Environmental Protection Agency (USEPA), the US Army Corps of Engineers (USACE), the US Air Force (USAF), the US Department of Energy (DOE), the Ohio EPA, the Kentucky Department of Environmental Protection (KDEP), the City of Columbus, the Ohio State University, and various banks, developers, and commercial and industrial Clients in both countries, including Imperial Oil, Pepsi, Nationwide Insurance, PNC Bank, and General Electric.

His experience with various types of projects have consisted of: Brownfields; military bases and facilities; former missile bases; DOE nuclear facilities; USEPA Superfund Sites; Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) facilities; other government facilities; downstream petroleum retail facilities; bulk petroleum plants; petroleum distribution facilities; chemical plants; various industrial manufacturing facilities; automotive and truck manufacturing plants; automotive and truck repair facilities; metal plating operations; dry cleaners; power plants; lead smelters; radioactive tailings dumps; cement manufacturing plants; quarries; abandoned landfills; abandoned chemical release dump sites; schools; airports; cell tower sites; large undeveloped tracks of land; commercial real estate; warehousing facilities; and, greenfield sites.

He has completed or provided technical expertise on hundreds of projects, including: various Phase I, II, and III environmental site assessments; remedial investigation/ feasibility studies (RI/FS); remedial design / remedial actions (RD/RA); RCRA facility investigation/ corrective measures studies (RFI/CMS); Record of Decision (ROD) actions; risk assessments; remedial action plans; risk management plans; remedial management plans; UST closures; remediation using various technologies; regulatory review and interpretation; confirmation documentation; SOP development and implementation; annual monitoring reports; environmental training; aquatic pathway assessments; environmental construction plans; asbestos surveys and abatement oversight; QA/QC implementation and review; bioremediation facility installation; air, solid waste, and storm water permitting; explosive gas planning, permitting and monitoring; field verification; litigation support; delineation and permitting of wetlands and other jurisdictional waters; database research; radon measurement; lead-based paint surveys, mold surveys and mitigation; storm water pollution prevention plans; hazardous materials surveys; and, other environmental and remediation activities.

Public and Stakeholder Outreach Experience

Mr. Lehar has held positions during his career as both a regulator and as a consultant, which required either public investigation or interviews with stakeholders, public town hall meetings, regulatory site meetings, or stakeholder education and project acceptance during his professional career. Major projects that have required some of the above coordination, included:

As the Project Manager for the Ohio EPA on the USEPA Skinner Superfund Site: The site was an unregulated landfill containing various solvents, semi-volatile compounds, metals, polycyclic aromatic hydrocarbons, and other contaminants that were in direct hydrologic connection with an adjacent waterway (Mill Creek). The site owners were also operating a daycare facility on the site. Investigations were conducted on the site including interviews with former employees and operators at the site to determine the universe of potential contaminants in the landfill. Numerous town halls were conducted to update the public on the investigation and the remedy selection process. Coordination was maintained with the Project Managers from USEPA Region 5, the local government, and the local air pollution control agency. Coordination was also maintained with the Agency for Toxic Substances and Disease Registry (ATSDR), due to suspected potential cancer clusters in the area. Numerous public meetings were held with a local citizens group and other interested parties, who were concerned about the potential health effects on the surrounding and downstream population. News coverage was extensive.

As the Project Manager for the Ohio EPA on the Southwestern Portland Cement Kiln Dust Landfill Site: This site was an unregulated cement kiln dust landfill containing arsenic and highly basic leachate that was flowing into a protected wetlands. The uncapped landfill was allowing rainwater to infiltrate completely through the kiln dust and solubilize the arsenic in the dust, allowing it to exit the landfill at the base as a leachate that flowed into the wetland. The leachate near the base of the landfill held a pH of 13. Numerous public meetings were held with a local citizens group and other interested parties, who had brought the landfill to the attention of the Ohio EPA. News coverage was extensive.

As the Consultant and owner of Millennium Environmental and Remediation Services, Inc. working for a local citizens group opposed to a proposed quarry operation: A company was planning on using ammonium nitrate explosives to break up the rock in an area of highly fractured bedrock and known sinkholes. Additionally, some of the sinkholes were known to contain Pleistocene mammal mega fauna remains, as well as potential artifacts from historical indigenous populations. Groundwater contamination from local animal herds (horses and cattle) was identified as an issue in the shallow bedrock, as was the use of septic systems in the area near local residential wells. Public meetings were held and discussions had with the Ohio EPA regarding the ease with which the local groundwater under the site may be contaminated by the nitrates, affecting local wells. An air permit that the company was attempting to secure for the site was also called into question.

As the Manager of the Environmental group at PSI, where the National City Bank was a Client: A Phase I ESA completed by our group identified potential industrial fill in the area of new construction for an NCB regional data hub. During this process it was found that the NCB Project Manager working on the construction site had planned on taking any excavated fill to be dumped at an unlicensed site. After consultation with bank officials, a contract was negotiated where PSI would handle the Phase II ESA work ahead of the construction to identify potential problem soils, and handled the tracking and disposal of the excavated soils. What had been a couple of thousand dollar Phase I ESA, turned into a multi-million dollar job, when extensive contamination was found under the proposed location for two massive emergency generator tanks and other areas of the site. Coordination was maintained with the local regulatory agency regarding the historical release and confirmation samples collected to prove that the site was clean after remediation.

As the Manager of the Environmental group at Clifton Associates, where the Sears was a Client: Sears asked Clifton to handle the investigation and remediation of a petroleum release at the North Hill Mall, which had flowed through a permeable zone under a neighborhood in the Hounsfield Heights/ Briar Hill area. He corrected previous geological interpretations for the site, which had limited the understanding and identified potential concerns the plumes might pose to the local residents. Additionally, he broadened the scope of the potential contaminants of concern with his assessment knowledge, realizing that previous consultants had failed to account for certain volatile compounds that have since been discovered at the Site. Meetings were held frequently with a local citizens group to explain the site conditions, as well as the progress regarding the investigation. Meetings were held individually with local residents to gain their acceptance and permissions for the installation of monitoring wells on their property, and subsurface vapour wells to monitor the potential vapours that might intersect their structures. Concerns were discussed and alleviated. A large public meeting was held for the community to explain the location, size, and health issues related to both the local groundwater and vapour plumes.

As the owner of Bifröst Environmental and Remediation Services, Inc. while working for an industrial Client attempting to sell a real estate location: A Phase I ESA was completed on the site, which had been expected by the real estate agent to be an easy site to clear. During the Phase I ESA investigation, historical documentation, which had been missed during previous Phase I ESA investigations, was identified by Mr. Lehar during discussions with the provincial regulatory agency. The data identified the site as the location of a former hazardous waste operation that had buried wastes on the site and went bankrupt, while being investigated by the provincial regulatory agency. Documentation was located in older files from the 1990s that indicated the site had been partially cleaned up. The location of the previously buried drums was investigated by Bifröst during a Phase II ESA and thorough documentation accumulated to show that the area in question was free of contamination. The real estate transaction was completed without incident. Contact was maintained with the local City of High River during the transaction, as the current government administration had been unaware of this previous incident.

Representative Technical Project Experience

- **Confidential Client, Calgary, Alberta** – Professional consulting services for a former propane distribution facility that has been sold, and the property converted into a retail strip center in the 1970s. After review of another consultant's prior reports, it was shown that they had failed to both determine the location of a suspected Site underground storage tank (UST), as well as that a gasoline service station had been present on the adjacent property. After the recommendation that the Client complete a geophysical survey on the property using ground penetrating radar as well as electromagnetics, the former location of the UST was found. It was also shown that the UST had been removed and allowed further investigation of the now determined potential source area. This saved the Client tens of thousands of dollars in unnecessary drilling, well installation, and sampling costs chasing the source area of a release. Additional work has been completed on the Site since, including air sampling, a risk management plan (RMP), monitoring, and well network repairs to comply with the RMP.
- **Confidential Client, Waiparous, Alberta -** Professional consulting services over the last four years for a wastewater spray field associated with a wastewater treatment plant, located at a Federal facility. Permits for the facility require sampling once every two years of the upper meter of soil at multiple locations, for indications of the accumulation of hazardous constituents associated with a spray irrigation process. Resulting laboratory analytical data were compared against the Alberta *Tier 1 Soil and Groundwater Remediation Guidelines* (current version in force at the time), as well as other standards and guidelines.
- **Confidential Client, Calgary, Alberta -** Professional consulting services for a commercial structure that a Client was interested in purchasing; however, the Client had their suspicions regarding the existing environmental reports. After review of the assessment and remediation reports, it was determined that the solvent remediation was not fully remediated, nor was the source conclusively identified. Further, a petroleum release identified on another portion of the property had yet to be delineated. Further investigation and remediation costs would exceed several tens of thousands of dollars at a minimum and could run into the millions. Additionally, the property would clearly fall into the jurisdiction of AEP, requiring full delineation and a RMP, at a minimum. The Client choose to pass on the deal after reviewing the analysis of information.
- **Various Confidential Clients, Alberta/British Columbia/Northwest Territories/Yukon -** Professional consulting services for a number of other environmental and remediation companies, organizing their field-collected and laboratory-analyzed soil and groundwater data and comparing it against the regulations, guidelines, and standards of the respective province where the sites are physically located. Several projects have required the review and revision of older data to accurately compare it against the current standards and to correct other consultant's mistakes.
- **Confidential Client, Calgary, Alberta –** Professional assessment services associated with the completion of drinking water sampling within a residential condominium complex in downtown Calgary. A previous testing event by another consultant identified the potential for lead to be present in the water supply. Testing was completed on numerous resident's water supply sources, including both hot and cold taps within bathrooms and kitchen. Common areas and restrooms were tested, as was water associated with the air conditioning system. High levels of lead and antimony were identified in portions of the system prior to interior filtration. After filtration by the building water supply system, the water was safe to drink for all units on all floors of the building.
- **Confidential Client, Airdrie, Alberta –** Professional assessment services associated with the completion of a Phase 2 Environmental Site Assessment (ESA) for a proposed housing subdivision. The results of the soil and groundwater sampling associated with one active and one abandoned petroleum well, indicated that contamination existed at both locations that may require remediation. The contamination associated with the abandoned well location appears to have been metals residuals associated with a sump or holding pond when the site was active. The source of the metals contamination of the groundwater associated with the active production well has not yet been determined.

- **Warwick Structures Group, Rocky View, Alberta -** Professional consulting services on an emergency basis to determine the extent of an arsenic release associated with blasting sands. The Client had been using a product for several years with the unintended consequences of residual metals associated with the product leaching into the subsurface. While collecting shallow soil samples, the suggestion was made to the Client to collect samples to a greater depth than originally contracted, so that if samples came back above Alberta *Tier 1 Soil and Groundwater Remediation Guidelines* (current version in force at the time), then the Client could submit additional samples from the subsequent intervals without completing additional drilling and still achieve vertical delineation, saving time and money.
- **Alberta Transportation, Alberta** – Contract acquisition and professional consulting services for former highway maintenance yards and satellite facilities, including review of previous consultant's work in both the Southern and North Central Regions. Much of this work included identifying and delineating petroleum and salinity releases from petroleum or salt distribution facilities, or retail petroleum service station sites acquired through right-of-way acquisitions.
- **Sears Canada, Calgary, Alberta** - Professional consulting services for a former service station site with a release that extends over 500 m through a residential neighborhood. Interfacing with various stakeholders including: residents, AEP, Alberta Health Services, a citizen's group, and off-site property owners. Completion of a site management plan that included: Site-specific risk assessment and Tier 2 revision; well abandonments; the installation of over 100 monitoring wells in five, unconsolidated lithologic units to complete the delineation; soil vapour network installation and monitoring; groundwater monitoring using HydraSleeves; and remediation using Plume Stop™.
- **Confidential Client, Edmonton, Alberta** - Professional consulting services for a former service station site including the review of historical records and previous consultant's reports. It was determined that the previous consultant failed to achieve the desired Tier 2 AESRD 2010 action levels, forcing additional review and remediation options. Options were generated for the limited disposal of soil that met the action levels, and allowed the Client to avoid costly additional remediation, saving $0.5 million.
- **Xcellent One, Calgary, Alberta** – Work has consisted of a review of previous documents, sampling of soil and groundwater, acquisition of a sewer discharge permit for contaminated groundwater, the installation of a sub-slab devapourization system and groundwater interception trench. Additional work to be completed includes delineation of the plumes, a risk management plan, and submittals to the City of Calgary and Alberta Health Services.
- **Imperial Oil, Calgary, Alberta** – Professional consulting services for a downstream former service station site including the review of historical records and previous consultant's reports. During the review, it was determined that the costs associated with the planned remediation of the site could be significantly reduced if site-specific action levels were generated. Initial calculations associated with the revised action levels indicated that a savings in remediation cost of over 75% were obtainable.
- **Imperial Oil, High River, Alberta** – Professional consulting services for a downstream former bulk plant and service station site including the review of historical records and previous consultant's reports, completion of an aquatic pathway assessment (AQP), Phase II services and the excavation of an oil/water separator and associated sumps and piping.
- **Imperial Oil, Calgary, Alberta** – Professional consulting services for a former laboratory site including the review of historical records and previous consultant's reports that determined that residual radioisotopes might yet be present on the site, as their contribution was overlooked during previous assessments. Additionally, the likely origins of a volatile organic compound (VOC) plume were found and plans put in place to complete additional Phase II services to verify the generated conclusions.
- **National City Bank, Cincinnati, Ohio -** Professional consulting services for a property transaction on a commercial structure including the completion of a Phase I ESA. The Client's comfort level with Mr. Lehar during the Phase I ESA led to additional assessment, which identified the area of a proposed building addition to have been the location of a former industrial landfill. Soil was to be sent to a construction and demolition debris landfill. Mr. Lehar's regulatory knowledge prevented the soil from being improperly disposed of by the Client's contractor, and diverted it to a licensed sanitary facility after the soils were determined to be non-hazardous. The project also led to the discovery of an orphan UST and extensive groundwater recovery. The identification and proper disposal of the impacted soils

saved the Client millions of dollars in fines and secondary handling of the soils, while bringing in fees for the Company in excess of over $1.2 million.

- **Joy and Associates, Lexington, Kentucky -** Professional consulting services for a property transaction on a commercial structure including the completion of a geophysical survey. Work by a previous consultant had determined that the property was clean. A Phase I ESA identified multiple recognized environmental conditions (RECs) including former drycleaners, filling stations, and a chemical manufacturing operation on the property. The geophysical survey identified a previously unknown UST that was associated with former dry cleaning operations.
- **The Ohio State University, Columbus, Ohio -** Professional consulting services for the completion of the Phase II ESA associated with the expansion of Ohio Stadium, "The Horseshoe." Prior geotechnical investigations revealed potential fuels and solvent contamination of the soils near the stadium. Mr. Lehar completed extensive soil, groundwater, surface sediment, and surface water investigations under the State of Ohio Voluntary Action Program (VAP) program protocols to place the Site in a position to complete a VAP risk assessment.
- **The Ohio State University, Columbus, Ohio -** Professional-consulting services for the construction of the Woody Hayes Athletic Center included the identification and assessment of microbial issues associated with a former roof leak and a porous exterior wall. Appropriate sampling and quantification of the mold, recommendations with respect to the remediation as well as oversight of the remediation allowed the project to stay on schedule.
- **Confidential Clients, Various Locations -** Professional consulting services for multiple property portfolio transactions on both undeveloped and commercial parcels. Phase I ESAs were completed on both urban and remote locations. Generally, transaction times required the completion of the portfolio within a three-week period. Identification of RECs led to additional Phase II ESAs, wetlands, asbestos, lead paint, mold, well abandonment, remediation, and other environmental issues.
- **Confidential Client, Springfield, Ohio -** Professional consulting services for a property transaction on a commercial structure during the Phase I ESA. The report included all required components according to American Society for Testing and Materials (ASTM) E1527 standards. Property structures were identified as having been built upon a former undocumented landfill. Identification of the landfill allowed the medical Client to end the transaction prior to the purchase of any historical liabilities related to the property.
- **Columbus Metropolitan Housing Authority, Columbus, Ohio -** Professional asbestos consulting services for a multi-story residential property led to the identification of asbestos within the drywall of the structure. Identification of alternative methods of laboratory analysis lead to the determination that the asbestos in the drywall was less than 1% and therefore not considered to be asbestos containing material by regulation; therefore, saving the Client over $1.1 million dollars in abatement costs.
- **Columbus Airport Authority, Columbus, Ohio -** Professional consulting services for various Hazardous Materials Surveys completed on acquisition properties. These surveys included environmental consulting services related to the discovery of asbestos, lead paint, polychlorinated biphenyls (PCBs), solvents, petroleum products, pesticides, and mercury identified during the property inspections. Identification led to proper disposal of the materials prior to demolition of the property structures.
- **JD Contracting, Columbus, Ohio -** Professional consulting services for a property transaction including National Environmental Policy Act (NEPA) Federal Communication Commission (FCC) checklists on an existing commercial structure for the installation of a new radio transmission tower that was critical to the new Homeland Security Act regulations. Site responsibilities included the completion of all required NEPA documents and review by the Ohio (State) Historical Preservation Officer (SHPO). Approvals given by the SHPO office in minimal time with no further additional documentation required.
- **Licking Valley Local Schools, Newark, Ohio –** Jurisdiction Determination achieved for a wetland and stream on the site of a proposed school. Site work included Cultural Resource Assessment (CRM) of three locations, which identified former cabins and a former tavern, suspected to have been the first structures in Licking County. In-ground radon samples were collected from the proposed school location in an effort to help design sub-slab mitigation measures, if required.

- **Watkins Trucking, Columbus, Ohio -** Professional consulting services for a property transaction on a commercial structure including the review of past UST removal services provided by another firm. The report included all required components according to ASTM E1527 standards. Although facility had a No Further Action (NFA) letter from the State of Ohio, inaccurate and incomplete information in the Closure Report led Mr. Lehar to suspect that residual petroleum hydrocarbons might still be present at the facility in excess of State of Ohio standards. Completed Phase II ESA indicated that residual petroleum hydrocarbon contamination was present in excess of State of Ohio standards, allowing Client to recover costs against the current owner prior to completion of the property transaction.
- **Citizens Group, Vanlue, Ohio -** Provided professional consulting and litigation research services for a local citizens group attempting to block the installation of a dolomite/limestone quarry. Geologic review indicated a shallow, highly fractured, and karsted bedrock aquifer extremely susceptible to shallow contamination influence, as demonstrated through local residential well sampling. Researched cutting-edge environmental issues related to the use of ammonium nitrate fuel oil (ANFO) explosives in quarrying operations, and their associated residuals left to contaminate the groundwater. Applied the lesser-known Surface Mining Law (SML) as related to groundwater projects, versus the Surface Mining Rules (SMR). Reviewed the surface mining permits for technical adequacy and completeness. Reviewed the Ohio EPA Division of Air Pollution Control (DAPC) Permits to Install (PTI) and Permits to Operate (PTO) for technical adequacy and completeness.
- **Various Residents, Vanlue, Carey, and Alvada, Ohio –** Managed a low-cost residential ground water sampling and analysis program to homes in the area surrounding a local geologic feature known as "The Ridge." Sampling for 13 parameters revealed that 17 of 23 (74%) wells exceeded Federal standards. This allowed residents to realize that their groundwater supplies were actually a potential danger to their health and to initiate action to install groundwater treatment systems to correct the problems.
- **Earth Tec Environmental of Ohio Bioremediation Facility, Columbus, Ohio –** Managed the site selection, design, and installation of a soil bioremediation facility within the Columbus, Ohio city limits. Mr. Lehar identified site selection requirements and necessary permitting requirements for installation and operation of the facility. Services provided included Ohio EPA air permit to install (PTI), air modeling, storm water permitting, and completion of the Ohio EPA Division of Solid and Infectious Waste (DSIW) Title 13 Director's letter (OAC 3745-27-13) requesting authorization to begin construction on a former solid waste facility. Original data on petroleum-contaminated soils was collected to satisfy PTI requirements. All permitting requirements were fulfilled and the bioremediation facility is the only site of its kind in the Columbus City limits.
- **Confidential Client, Cleveland, Ohio –** Developed and managed a Phase II ESA based upon another firm's incomplete Phase I ESA at a former pesticide application facility. Recommended to the Client extensive testing regimen based upon previous site historical usage. Analyses confirmed extensive contamination of site and Client refrained from purchase of the property, saving himself and his business several hundreds of thousands of dollars in cleanup and remediation costs.
- **Former Anchor Solid Waste Landfill, Columbus, Ohio -** Managed the conception, design, and development, of an explosive gas-monitoring plan under OAC 3745-27-12 for a Client-owned, former solid waste landfill who wished to lease the land to another interested party. Included interactive planning with regulatory personnel from the Ohio EPA. The initial monitoring yielded data that indicated that methane from an adjacent landfill was migrating to the Client's property.
- **Confidential Client, Columbus, Ohio –** Managed Phase II and III ESAs, Risk Assessment, Remedial Action Plan design and implementation for an automobile sales and service facility where three leaking used oil USTs were formerly located. Previous investigations indicated that an extensive amount of soil and groundwater had been impacted and required remediation. Remediation was made difficult by the presence of an actively utilized service structure overtop the majority of contamination. A Remedial Action Plan (RAP) was designed to remediate both the soil and groundwater, while recovering free product. The RAP was designed in phases to minimize disruption of site commercial operations, while maximizing remedial efforts. Remediation was completed to all State of Ohio requirements.
- **Army Corps of Engineers, Crab Orchard, Illinois -** Served as the project manager for all sampling and analytical functions associated with this NPL (Superfund) Project, including submittal of the Quality

Assurance Project Plan (QAPP), Field Sampling Plan, and Air Monitoring Plan and their subsequent approval. Mr. Lehar was also responsible for the validation of all data packages to Level IV.

- **Air Force Center for Environmental Excellence, Eaker AFB, Arkansas** – Served as the Plan Development Support Manager of a team, which developed and submitted an Environmental Cleanup Plan (ECP) for Delivery Order #2 remediation activities. The ECP received minimal comment.
- **DOE, Portsmouth, Ohio -** Project manager and key data validation for several data validation projects involving Ohio EPA RCRA Closure rules at the Portsmouth Gaseous Diffusion Plant, near Piketon, Ohio. Data validation consisted of level III USEPA protocols per standard guidance and procedures. Full data validation has included all TAL/TCL parameters and several radiological compounds.
- **DOE, Paducah, Kentucky -** Lead hydrogeologist for the installation of twelve soil borings, nineteen monitoring wells, and four extraction wells at the Paducah Gaseous Diffusion Plant, near Paducah, Kentucky tracking a Technetium groundwater plume. This six-month project included the installation of pumps, transducers and data loggers, as well as unexpected changes in project scope due to the identification of a gas pocket at depth.
- **NCR Corporation, Cambridge, Ohio -** Project manager of a team, which gathered data on 34 groundwater-monitoring wells at this facility. All sampling was completed per USEPA and Ohio EPA guidance for landfill closures. All wells were properly purged, with pH, temperature, and specific conductivity data gathered prior to actual sampling, on a semi-annual basis. Associated groundwater potentiometric data was also gathered. Groundwater data characterized utilizing USEPA GRITS database statistical system.
- **Ohio Army National Guard, Columbus, Ohio -** Project manager for the RCRA closure of a UST at The Ohio Army National Guard's Willoughby, Ohio Armory. The closure consisted of the preparation of a sampling and analysis plan, quality assurance project plan, health and safety plan, and associated field sampling, data validation, and preparation of the closure report. This was the first RCRA closure done by The Ohio Army National Guard.
- **Ohio Department of Transportation, Southern Ohio -** Program Manager for a task order contract under (Ohio Department of Transportation) ODOT District 8. Task Order projects included Phase I and II ESAs, asbestos abatement oversight, TPH remediation oversight, and professional services consulting.
- **Chase Brass and Copper, Montpellier, Ohio** – This facility is a brass recycler that used vapour degreasers to clean brass scrap prior to smelting. Several releases occurred at the facility, including leaking degreasers, damaged USTs, and releases to a septic field that eventually found its way to a storm drain and creek. Field manager in charge of the installation of dozens of groundwater monitoring wells, which varied in depth from less than 50 feet to total depths of over 200 feet to sample for trichloroethylene (TCE).
- **ESC, Cambridge, Ohio -** Project manager for this radiological investigation of an old quarry fill suspected to contain radioactive slag from a local Nuclear Regulatory Commission (NRC) site. The Client was interested in putting a new multi-million dollar facility in place, and required a very thorough investigation to minimize potential liabilities.

References available upon request



Contact Information

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Dual Citizen USA/Canada

Bifröst
Environmental and Remediation Services Inc.

Resume of Wendy E. Roberts Thorne,

M.E. Des., P.Eng. (AB)

Employment

Bifröst Environmental and Remediation Services, Inc. (Bifröst), Calgary, Alberta. January 2023 – Present
Contractor – Senior Environmental Engineer
Athena Environmental Consultants Ltd., Calgary, Alberta. December 2014 – December 2022
Principal
Williams Engineering Canada Inc., Calgary, Alberta. March 2013 – November 2014
Senior Environmental Engineer
Biophilia Inc., Calgary, Alberta, March 1994 – March 2013
Principal
University of Calgary, Faculty of Environmental Design, Calgary, Alberta. September 1999 – Present
Adjunct Assistant Professor
Quality Certification Bureau, Edmonton, Alberta. October 1999 – December 2000
ISO 14001 Auditor
Southern Alberta Institute of Technology, Calgary, Alberta. September 1996 – June 1999
Contract Instructor
Golder Associates, Calgary, Alberta. March 1993 – April 1994
Senior Environmental Engineer
H.F. Thimm & Associates, Calgary, Alberta. September 1990 – March 1993
Professional Associate
University of Calgary, Calgary, Alberta. September 1988 – May 1989
Adjunct Assistant Professor
Energy Resources Conservation Board, Calgary, Alberta November 1986 – August 1987
Drilling Engineer/ Reservoir Engineer
Energy Resources Conservation Board, Calgary, Alberta July 1981 – November 1986
Environmental Engineer

Education

Master of Environmental Design (M.E.Des.), University of Calgary, 1990
Bachelor of Applied Science (B.A.Sc.), Bio-Resource Engineering, University of British Columbia, 1981

Certifications/Registrations

APEGA Professional Engineer #34444, Calgary, Alberta, January 1984*
* Current

Publications

W. Thorne, 2009. "Guidance Manual: Potential Impacts of Petroleum Hydrocarbon Contamination on Fish and Fish Habitat." Fisheries and Oceans Canada.

W. Thorne, 1998. "Working and Negotiating with the Regulatory Authorities, Environmental Management of Processes and Projects, Integrating Health and Safety with Environmental Management, The Defence of Environmental Charges", Understanding Environmental Regulations – Due Diligence, Educational Program Innovations Centre, Faculty of Continuing Education, University of Toronto; Continuing Education Courses offered through the Calgary Environmental Trade Show.

W. Thorne, A. Basso, F. Bres, L. Ostrinsky, and S. Friesen, 1997. "Introduction to Environmental Engineering", Bangladesh Gas Engineers Training Program, Southern Alberta Institute of Technology.

W. Thorne, 1996. "The Field Collection of Environmental Data for Human and Environmental Risk Assessment", AIHA Alberta, Fall Technical Symposium, Risk Assessment, Communication and Management, Calgary.

W. Thorne, 1996. "Management of Contaminated Sites". Continuing Education Course, Environmental Services Association of Alberta and Canadian Prairie and Northern Section, Air & Waste Management Association; Environment Business South.

W. Thorne, A. Basso and S. Dhol, 1996. "Identification and Assessment of Trace Contaminants Associated with Oil and Gas Pipelines Abandoned in Place", ASME International Pipeline Conference, Calgary, Alberta.

H.F. Thimm and W. Thorne, 1995. "Cost Control in Environmental Assessments and Damage Evaluations", presented at the Society of Petroleum Engineers, Canadian Section, 3rd Annual Operating Cost Symposium, "The Challenge of Optimizing Operating Costs", Calgary, Alberta.

W. Thorne, 1993. "Management of Contaminated Sites". Continuing Education Course, Air and Waste Management Association Training Institute, Northwest Regional Centre, Calgary.

W. Thorne and R. Revel, 1991. "The Influence of Seeding Pattern and Physical Amendments on Crust Strength of Phosphogypsum Tailings and Biomass Production", Restoration Management Notes, Nov., University of Wisconsin Press.

H.F. Thimm, D. Poon and W. Thorne, 1991. "Water Management in the Oil and Gas Industry". Continuing Education Course, CIM (Petroleum Section), Society of Petroleum Engineers, Asia Pacific Oil and Gas Conference and Exhibition, Perth, Australia.

W. Thorne and R. Revel, 1989. "The Application of Germination Tests to Revegetation of Phospho-gypsum Tailings: Preliminary Findings", presented at the conference Reclamation, a Global Perspective, Calgary, Alberta.

W. Thorne, H. Lillo, and D. Beamer, 1985. "Ensuring Public Safety in the Event of an Uncontrolled Release of Sour Gas", presented at the Annual Meeting of the Air Pollution Control Association, Canadian Prairie and Northern Section, Calgary, Alberta.

Representative Technical Project Experience

- **Phase I Environmental Site Assessments (ESA), Various Clients, Multiple Locations** – Phase I ESA projects have included greenfield agricultural sites, recreational facilities, multi-family residential sites, care homes, a funeral home, roads, shopping centres, auto dealerships, restaurants, former gasoline service stations, oil and gas well sites and other production facilities, multi-tenant commercial and industrial sites, heavy industrial sites such as a metals foundry and sandblasting facilities, tank farms, fertilizer plants, and a decommissioned oil refinery. Clients have included developers, private and public companies, and municipalities. The majority of the assessments were conducted for the purpose of establishing environmental due diligence in the refinancing of the property. The potential for contamination and other environmental liability was identified through a historical records search, site inspection, and follow up research where necessary. Assessments were performed to meet the applicable regulatory guidelines and professional practice standards such as CSA. Recommendations were made to proceed to Phase II ESA where there was evidence of a significant potential for the presence of site contamination. Cost saving measures for Phase II investigations were recommended where appropriate.
- **Confidential Client, Confidential Location, Alberta -** Co-ordinated and managed a team, and designed the assessment work, for a Phase I and Phase II Environmental Site Assessment of a refinery site that had undergone decommissioning and remediation. The work was conducted for a potential purchaser and our work was monitored by the site owner's environmental consultant. The Phase II ESA included excavation and sampling of test pits; drilling, installation, and sampling of groundwater monitoring wells; and installation and testing of wells for a potential domestic use aquifer (DUA) exclusion. Areas of residual contamination were identified and mapped.
- **Town of Okotoks, Alberta -** Conducted a Phase I and II ESA of a former landfill, now located in a residential area. Phase II ESA investigations included installation and sampling of both groundwater and methane monitoring wells. Designed and supervised the installation of a self-venting methane barrier to protect an adjacent public recreational facility. A Risk Management Plan for ongoing management of methane was developed. Monitoring of the methane wells is being conducted on an ongoing basis.
- **Confidential Client, Calgary, Alberta -** Conducted a Phase II ESA of a historical landfill with both permitted and non-permitted waste disposal areas. Prepared a landfill closure plan. Negotiated extensively with both the City of Calgary and Alberta Environment for acceptance of the closure plan. Implemented the closure plan and ultimately received regulatory closure. The area surrounding this former landfill has now been developed for residential and commercial use.
- **Confidential Client, Calgary, Alberta** – An application for an Approval under the Alberta Environmental Protection and Enhancement Act (EPEA) was prepared for the construction and operation of a new industrial facility. This process included division of responsibilities with the client for preparation of various sections of the application, and extensive communication to ensure the application process met corporate deadlines. Work is currently ongoing to assist the client in meeting the Approval conditions, including annual groundwater monitoring and reporting.
- **Confidential Client, Hussar, Alberta** – An application for an Approval under the Alberta Environmental Protection and Enhancement Act (EPEA) was prepared for an agricultural client for an existing recycling facility. Soil and groundwater monitoring is being conducted on an ongoing basis to ensure that EPEA Approval conditions are being met. Liaison and negotiation with Alberta Environment is also being conducted regarding the Approval conditions and interpretation of regulatory requirements.
- **Confidential Client, Calgary, Alberta -** Developed an E2 Plan for a large logistics warehouse with an ammonia refrigeration system, to meet the requirements of the federal Environmental Emergency Regulations. Services included but were not limited to documentation of plan administration and continual improvement procedures; ammonia system description, facility configuration, and measures for release prevention; determination of potential release scenarios through various methods; modeling of ammonia dispersion, flammability, and explosion hazard zones; and response procedures in the event of a release. Currently provide ongoing advice and support.

- **Confidential Client, Edmonton, Alberta** – Prepared a Management Plan for Hazardous Products to assist in the establishment of environmental due diligence in the management of multi-tenant industrial/commercial buildings. The Plan addressed the diverse range in the quantities and types of products and chemicals used and stored by the tenants, and that there is also a wide range in the familiarity of different tenants with the regulatory requirements and industry practices relating to hazardous products. The Plan was prepared to assist the building operators and tenants in meeting the requirements of the BOMA Best Practices framework. A checklist was prepared and implemented through annual inspections of the tenant operations to determine compliance with the Plan.
- **Confidential Client, Cochrane, Alberta** - A Phase I ESA was conducted which identified the potential for a drilling waste disposal area from a historical wellsite (dry hole). Drilling records were obtained and reviewed, and the presence of invert (diesel-based) drilling mud was identified. An area of buried invert drilling mud was identified, assessed, and then remediated through excavation. Groundwater monitoring wells were installed and sampled and the potential for groundwater contamination was ruled out.